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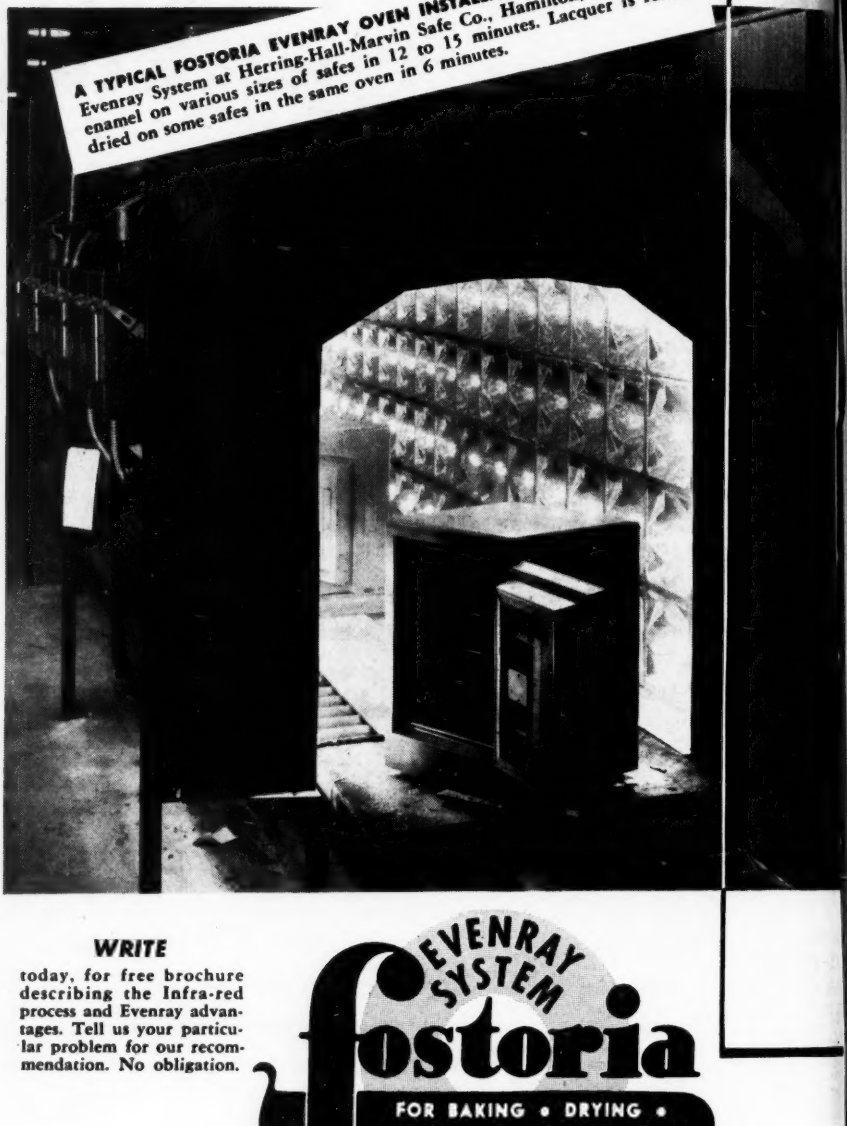

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pf editorial

FEBRUARY, 1949

Vol. 13, No. 5

Where Does The Finish Start?

The conventional answer to that question would be, "The finish starts with the first operation in the finishing department." However, as many finishing supervisors know to their sorrow, that first operation in the finishing department is sometimes not strictly a finishing operation, but a repair operation or an additional process operation made necessary by improper fabrication and/or lack of adequate inspection.

Zinc-base die castings may be delivered to the plating department with a "skin" or surface caused by improper casting technique. An extra polishing operation is required before the castings may be plated or finished properly. Likewise, iron castings, poured or "shaken out" at too high a temperature will have a "chilled" surface that is difficult to machine, polish and plate, or porcelain enamel successfully.

Steel parts to be painted or porcelain enameled may receive so many dings and scratches in the fabrication department that a great amount of time must be spent on extra metal finishing repair operations before the parts may proceed smoothly in the finishing process.

All porcelain enamel supervisors are familiar with the blisters formed on firing "laminated" steel sheets—a defect resulting from improper sheet manufacturing operations. Electropolishers have found that stainless steel overpickled or overannealed at the steel mill will not electropolish properly.

Additional finishing operations made necessary by improper fabrication add uncalculated costs to the final product. Further, in a manufacturing organization completely conveyorized from fabrication to final assembly, extra finishing operations cause costly delays all through the plant. Surely the increased expense of close control of fabrication operations through careful inspection is justified by the resulting reduction in finishing cost and assembly delay, not to mention the reduction in mental stress and strain on the finishing supervisor.

E. A. Blount

Machine Tool Plating Installation Engineered For Efficiency And Appearance

The application of sound engineering principles combines with neat, attractive arrangement to make the new plating department of The Landis Tool Co., Waynesboro, Pa., an outstanding example of modern plating practice.

By EZRA A. BLOUNT

pf FEATURE

The finish applied to consumer products affects directly product quality, and hence product acceptance and sale. Likewise, in the manufacture of machine tools, it is the accepted practice to apply a high-quality finish which will resist the corrosive action of shop oils, greases, and cutting lubricants as well as abrasive effects of normal service. During the war, in the national interest, restrictions were placed on the use of the high-quality finishing materials normally used on machine tools. When these restrictions were removed after the war, The Landis Tool Company was quick to reinstate the high-quality finishes normally used on machine tools, realizing that an attractive and serviceable finish on the completed machine tool had a tendency to inspire confidence in the product.

To further add to the appearance and serviceability of the company's line of grinders, the practice of chromium plating handwheels, feed shaft caps, graduated scales, valve stem knobs, and various other parts of the grinder was initiated. Figure 1 is a view of a completed grinder showing in detail the chromium plated parts. In order to control and maintain the quality of the chromium plated finish at a high level, the company recently installed a modern plating department

in which no feature contributing to efficient operation and attractive appearance was overlooked.

The plating department is housed in a modern brick and glass block building, well lighted not only by light conducted through the glass blocks but also by fluorescent light fixtures installed flush in a flat ceiling (see Fig. 2). To provide for adequate ventilation, attractive air exhaust fixtures are also installed flush in the ceiling and connected to exhaust fans having sufficient capacity to provide a complete change of air every six minutes. Departing from the usual plating practice of using wood slatted flooring, this plating room is so designed that the operators can work on a floor which is dry at all times. However, to be sure that plating acids and other chemicals which might occasionally be spilled would not damage the floor, Rulon Trinidad acid resisting flooring has been used as the flooring material.

The plating installation proper consists of four parallel lines of tanks, each line set in a drained acidproof sump extending below the floor level with the four individual drains then connected to the main sewer line. As can be noted from the article heading and Figure 3, the tanks and all the necessary piping, heating equipment, electrical connections, exhaust equipment, temperature control equipment, and all other accessories are enclosed in streamlined hoods or housings made of 16 gauge steel sheet. In addition, these hoods provide working areas which can be used for racking and unracking parts to be plated or for the temporary storage of parts before

Fig. 1—A view of a completed Landis Tool precision cylindrical grinder which has been fitted with chromium plated controls for improved appearance and serviceability

or after plating, and storage cabinets which can be used to store materials used in the plating process. Access to automatic temperature controls, piping and other tank accessories may be gained through doors in the various housings, as illustrated in Fig. 4.

With all tanks and accessory equipment enclosed in a housing or hood of this type, not only does the completed installation present an unusually attractive appearance, but also the problem of keeping tanks and associated equipment clean at all times is greatly simplified. To protect the steel housing from possible corrosion and from the effects of normal use, it has been finished inside and out with one coat of Ucilon aluminum paint and two coats of Ucilon clear lacquer. The tanks are insulated electrically from the surrounding hood or housing and from underlying drain sumps by means of Synthane insulators. Unichrome Resist sheet material is used to form bridges between adjoining tanks so that the solution draining from racks of parts in process cannot drip down between the tanks as the operator transfers the racks from one tank to another throughout the plating process.

In the four parallel lines of hooded plating tanks facilities are provided for the following operations:

Line 1

1. Electroclean
2. Cold water rinse
3. Acid rinse
4. Cold water rinse
5. Copper flash
6. Bright copper plate

Line 2

1. Soak clean

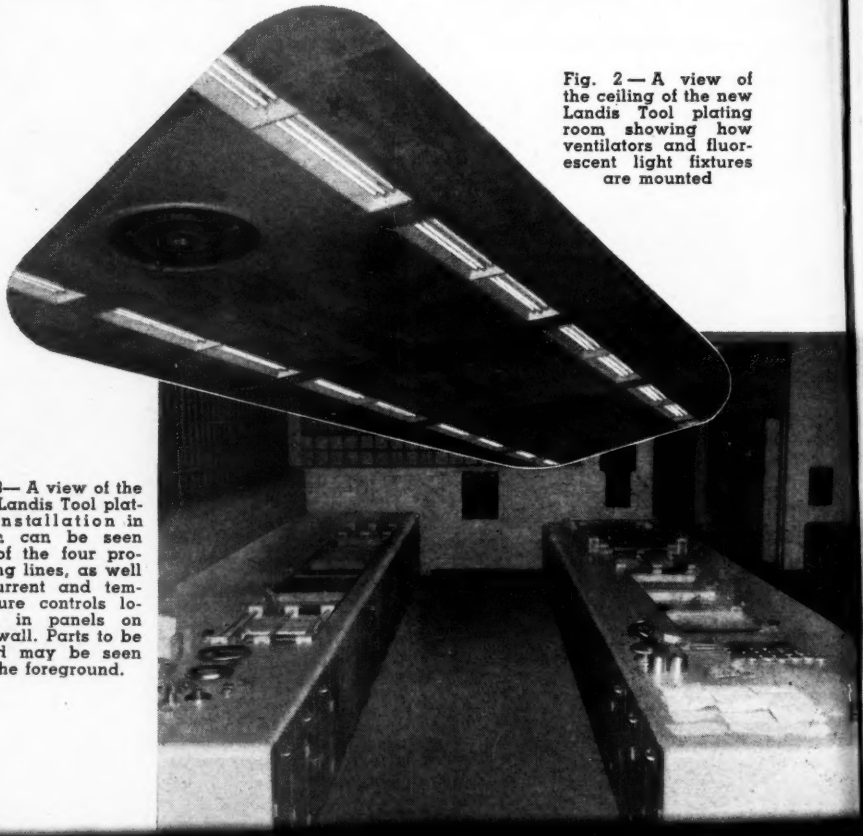

Fig. 2 — A view of the ceiling of the new Landis Tool plating room showing how ventilators and fluorescent light fixtures are mounted

Fig. 3— A view of the new Landis Tool plating installation in which can be seen two of the four processing lines, as well as current and temperature controls located in panels on rear wall. Parts to be plated may be seen in the foreground.

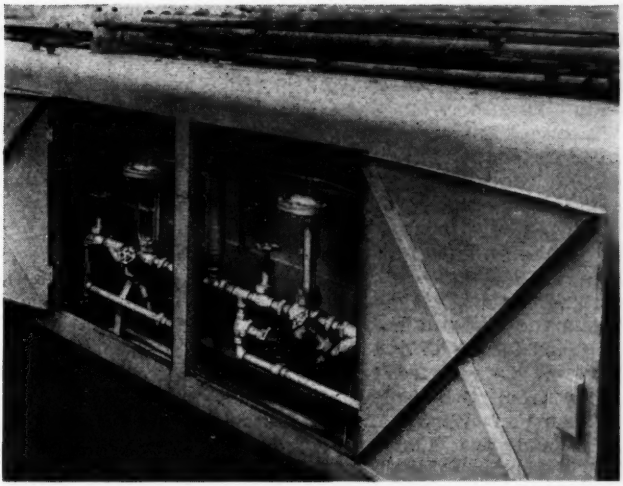

Fig. 4—Illustration shows swinging doors in housing around chromium plating tank in the open position to permit access to temperature control equipment.

2. Electroclean
3. Cold water rinse
4. Acid dip
5. Cold water rinse
6. Bright nickel plate
7. Cold water rinse
8. Hot water rinse

Line 3

1. Reverse current chromium treatment.
2. Chromium plate
3. Concentration rinse
4. Cold water rinse
5. Hot water rinse

Line 4

1. Electroclean
2. Cold water rinse
3. Acid dip
4. Cold water rinse
5. Concentrated muriatic acid strip
6. Reverse current sulfuric strip
7. Cold water rinse

The tanks used for the various processing operations are made from ¼-inch steel plate. Cleaners, water rinse tanks, acid dipping tanks, copper strike tank, hot water rinse tanks, and strip tanks are constructed 36 inches long x 24 inches wide x 30 inches deep with the solution level maintained 6 inches below the top of the tank. The tank used for a reverse current treatment prior to chromium plating is 36 inches long x 28 inches wide x 33 inches deep. The tanks used for bright copper plating and bright nickel plating are 60 inches long x 36 inches wide x 36 inches deep. The tank used for chromium plating is 72 inches long x 36 inches wide x 36 inches deep.

To aid in maintaining a clean installation and for protection against corrosion, all tanks are painted on the outside with Ucilon tank coating material. The various acid dipping tanks, as well as the bright copper plating tank and bright nickel plating tank, are rubber lined. The tank containing chromic acid is lined with acid resisting brick (Knightware) which is installed in a single course on the sides and a double course on the tank bottom. The chromic acid reverse tank and the sulfuric acid reverse current stripping tank are lead lined.

The various cold water rinse tanks through which water is constantly flowing are provided with either standpipe overflows or dam type overflows

to maintain surface cleanliness of the solution. All cleaner tanks and hot water rinse tanks are fitted with steel steam coils and manual controls for maintaining the proper operating temperatures. Control valves are also provided for admitting fresh water to the various processing tanks. As can be seen in the accompanying illustrations, the only controls which project above the smooth surface of the tank hoods or housings are the attractively designed plastic valve handles by which the operator may admit water or steam to the various tanks.

Power is supplied to the plating room from two 500-ampere 6-volt Hanson-Van Winkle-Munning rectifiers and one 1,000-ampere 6-volt H-VW-M generator. Figure 5 is a view of the rectifier and generator installation. One rectifier supplies power to Line 1 of the plating setup for the cleaner, copper flash, and bright copper plating tanks. The other rectifier supplies power to Line 2 for the electrocleaner and bright nickel tanks. It is worthy of note that the cleaners mentioned are connected across both rectifiers so that maximum current can be drawn if desired. The generator supplies power to Line 3 of the plating setup for use in chromium plating.

Both the bright nickel tank and the chromium plating tanks are fitted with special exhaust hoods located under the main tank housing. The exhaust for the chromium plating tanks is further equipped with a whirl fixture for removing drops of chromic acid from the air stream and with facilities for washing down the inside of the pipe with water periodically so that the accumulated chromic acid may be reclaimed and used as solution make-up for the reverse current chromium treatment tank.

Cast iron or steel parts to be plated are polished in a polishing room located in an adjacent, separate building in the usual manner. The process consists of a polishing operation using 120 emery on a setup wheel, followed by 180 emery and finishing on a sewed buff using Lea Compound Grade C or Grade N. In the polishing of steel parts, the preliminary emery operations can sometimes be eliminated, de-

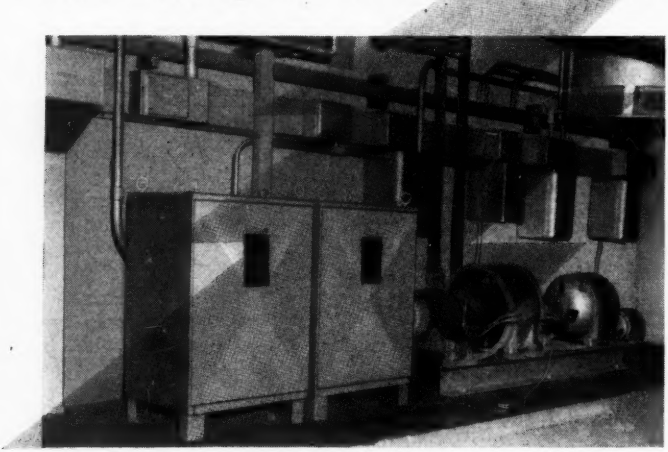

Fig. 5—Located in a separate room under the plating room, the two rectifiers and motor generator set which furnish power for the plating installation are illustrated here.

Fig. 6 — Close-up view of bright copper plating tank

pending upon the quality of the base metal and the finish desired. It is the intent to produce a very smooth finish on the parts before they enter the plating department so that buffing between plating operations is eliminated in almost all cases.

Parts to be plated are racked on wire or on plating racks coated with Unichrome rack coating and progress through the following operations:

1. Reverse current clean in H-VW-M electrocleaner, operated at 180-200 deg. F. for 2 to 3 minutes.
2. Cold water rinse.
3. Muriatic (hydrochloric) acid dip, 15 per cent by volume.
4. Cold water rinse.
5. Copper strike until covered in a solution of the following composition:
   Copper cyanide _____3.2 oz./gal.
   Sodium cyanide _____4.5 oz./gal.
   Sodium carbonate ____2 oz./gal.
   Temperature—140 deg. F.
   Anodes—cast copper, rolled and annealed.
6. Cold water rinse.
7. Bright copper plate in Unichrome bright copper solution, at a temperature of 140 deg. F. and a current density of 20-70 amperes per square foot, (pH 8.2-8.8) for 15 minutes (30 minutes for cast iron parts which must be copper buffed). Figure 6 shows the plater lowering a part into the bright copper solution. The temperature of this solution is controlled automatically and heat is supplied to the solution through a steel steam coil coated with a 0.003 inch thickness of nickel plate. The solution is agitated continuously with air supplied to the solution through perforated Synthane pipes located below the cast copper, rolled and annealed anodes. Continuous filtration is used to maintain maximum clarity of the solution and to ensure that the solution is thoroughly mixed at all times.
8. Cold water rinse.
9. Bright nickel plate in H-VW-M 9H bright nickel solution of the following composition:
   Nickel sulfate _____32 oz./gal.
   Nickel chloride ____ 4 oz./gal.
   Cobalt sulfate _____ 0.35 oz./gal.
   Boric acid _____ 4 oz./gal.
   Ammonium sulfate 0.10 oz./gal.

Fig. 7—A view of the bright nickel plating tank showing temperature and voltage controls mounted on the wall in the background

Formaldehyde _____ 0.33 oz./gal.
Nickel formate ____ 6 oz./gal.
The solution is operated at a pH of 3.7 electrometric (4.2 colorimetric) and a current density of from 40 to 60 amperes per square foot. A temperature of 155 deg. F. is maintained with the aid of a Duriron heat exchanger and an automatic temperature control. The solution is filtered continuously, the filtrate being pumped back to the tank through the heat exchanger by a Duriron pump. Four perforated pipes located in the tank bottom conduct air into the solution for continuous air agitation. Blowers supply air for agitating both the bright copper and bright nickel solutions at the rate of 45 c.f.m. at 3 lb. pressure. Figure 7 shows a rack of parts being placed in the bright nickel tank.

10. Cold water rinse.
11. Chromium plate for from 2 to 3 minutes in a solution containing:
Chromic acid _____250 gm./l.
Sulfate _____ 0.25 gm./l.
at 1-2 amperes per square inch current density. A temperature of 120 deg. F. is maintained with the aid of automatic temperature control equipment. Heat is supplied through a lead steam coil. Figure 8 is a view of the chromium plating tank.
12. Reclaim (concentration) rinse.
13. Cold water rinse.
14. Hot water rinse.

For parts which are bright copper plated for 30 minutes and then buffed prior to bright nickel and chromium plating, the process is as follows::

1. Immerse in H-VW-M 40-W soak cleaner.
2. Electroclean 2 to 3 minutes in H-VW-M electrocleaner using reverse current and steel cathodes.
3. Cold water rinse.
4. Muriatic (hydrochloric) acid dip.
5. Cold water rinse.
6. Bright nickel plate.
7. Cold water rinse.
8. Chromium plate.
9. Reclaim (concentration) rinse.

10. Cold water rinse.
11. Hot water rinse.

Stripping facilities consist of a solution of 50 per cent by volume muriatic (hydrochloric) acid which is used to remove chromium from defective parts. Oil and grease on defective parts may be removed in an electrocleaner prior to the stripping operation. Nickel and copper can be removed from defective parts by making them anodes in the sulfuric acid reverse current stripping solution in which lead cathodes are used. The stripped parts may be rinsed in cold and then hot water and returned to the polishing room for reprocessing.

Anticipating that facilities for hard chromium plating might be advantageous, provisions were made when the plating installation was planned so that hard chromium plating could be done if desired. Facilities are available to electroclean and rinse parts to be hard chromium plated after which they are processed with reverse current in a solution containing 250 gm./l. of chromic acid and operated at 120 deg. F. After a very short treatment in this solution, the parts are placed directly into the regular chromium plating tank illustrated in Fig. 8 and plated with chromium to the desired thickness. The usual water rinses follow this operation.

The various plating solutions are controlled in an adjoining plating and metallurgical laboratory, a view of which is shown in Fig. 9, with the aid of modern analytical equipment. The

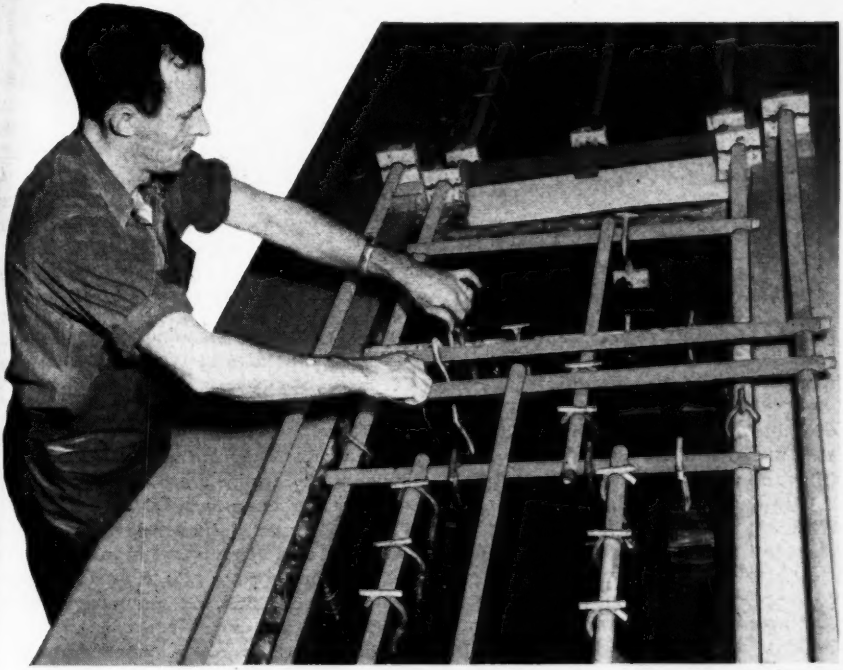

Fig. 8—Close-up view of chromium plating tank showing anode and cathode rod arrangement. Since the rods may be moved, the installation is extremely versatile for plating objects of different size.

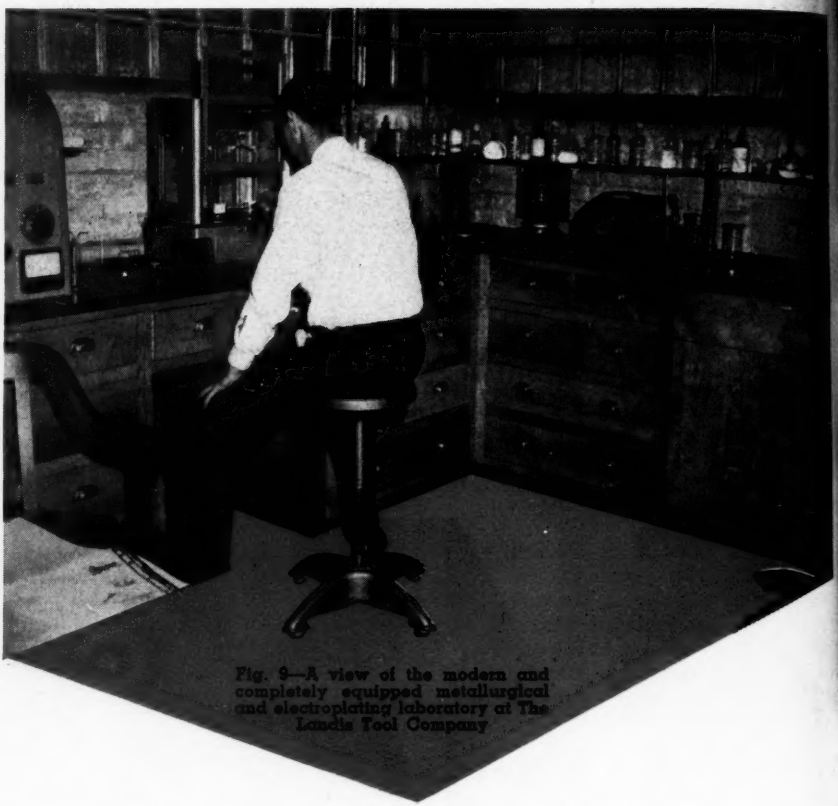

Fig. 9—A view of the modern and completely equipped metallurgical and electroplating laboratory at The Landis Tool Company

pH of the bright nickel solution is determined with a Beckman pH meter; the density of the chromium plating solution is checked daily with a hydrometer, and other solution ingredients are analyzed chemically by means of standard analytical procedures.

The Landis Tool plating installation, while it was not designed and constructed to be used for mass production plating, has been laid out to combine operating efficiency with neatness and attractive appearance. It is an excellent example of modern plating room design in which adequate provision has been made for all forseeable emergencies, for employee comfort and safety, and for adequate and complete chemical and metallurgical control of the process.

Titanium is present in enormous quantities in the earth's crust. The problem up to now has been to get it out of the ore. The ninth most common element and the seventh most common metal in the earth's crust, there is more of it in existence than all the lead, zinc, tin, antimony, nickel, copper, gold, and silver combined. All vegetation and coal are comprised largely of carbon---but the earth's crust and atmosphere have about 23 times as much titanium as carbon.

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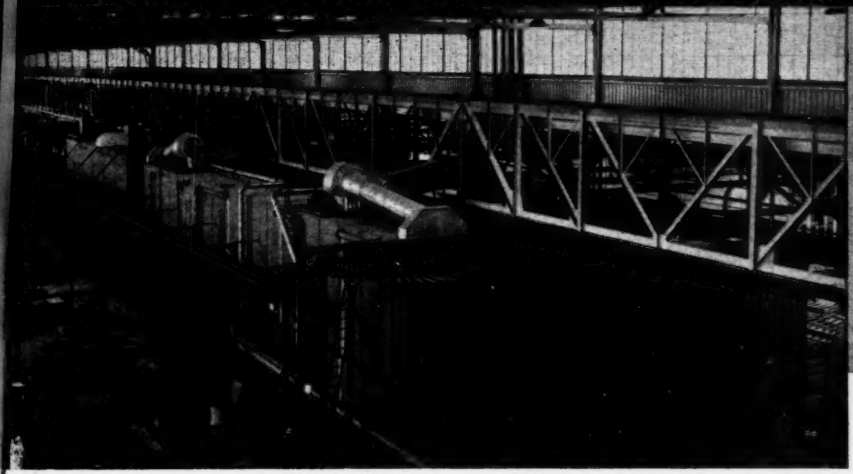

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ere is another typical Mahon solution of a finish- g problem which involved prime coating metal oors and frames, metal wall panels up to ten feet length, and a variety of other metal parts of any shapes and sizes. Combination gas and oil ed heating units were engineered into this entire stem—for Metal Cleaning and Chemical Prep- ration Equipment as well as Dry-off and Final ake Ovens change over from gas firing to oil ring may be accomplished in a matter of seconds ithout interrupting production. When you con- mplate new, modern finishing equipment—regardless of what your finishing problem may be —remember that Mahon has pioneered development in this highly specialized field for twenty-eight years . . . this broad experience, which covers many diversified industries and is world-wide in scope, together with constant experimental research, has endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. Better planning, better engineering, and a better and more economical job of finishing is the result. See Sweet's Mechanical Industries File for complete information.

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AHON

By GEORGE BLACK

THE inability to segregate the exact components of "hardness" has led t the development of a wide variety of testing machines and device operating on many different principles, and using a multitude of testin implements. Division is, of course, an arbitrary matter. It has bee decided to follow Henry Gardner's "Physical and Chemical Examination" in thi listing, and to avoid the controversials by indicating the mechanism of th test methods rather than by attempting division as to the property being teste

METHOD I—SCRATCH HARDNESS

Tests	Description
Laurie-Baily Hardness Tester	A vertical coil spring, adjusted by a unit traveling on a threaded rod, applies pressure on a hard- ened blunt steel point. The sample is drawn under the point and pressure is increased until scratch is made.
Graham-Linton Hardness Tester	Pressure on an extended knife is increased in 100 gram intervals until the film is completely re- moved from the panel as the instrument is drawn across it.
Clemen Apparatus	A short knife blade, attached to the under side of one arm of a balance beam, is increasingly weighted until a scratch is produced as the sample is drawn beneath it.
Wilkinson Pencil Method	Lead pencils of increasing hardness are drawn across the sample until one is found which will cut the film without leaving a black mark.

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Korb-Pettit Spiral Woven Wire Conveyor Belts are fabricated in suitable metals and mesh sizes for baking, conditioning, heat treating, material-handling, processing and washing. Particularly well adapted to conditions where drainage and the free circulation of air are required. K-P Flextrough Belts with flanged edges prevent the escape of small parts. Side chains can be provided for sprocket drive.

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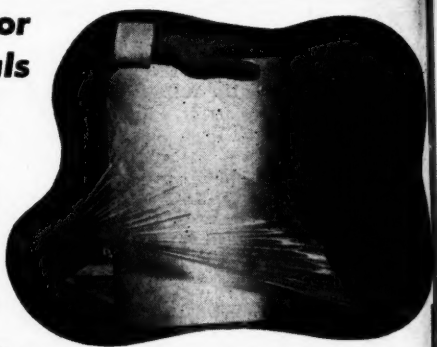
Wire mesh, Spiral Woven Wire Conveyor Belts, Infra-Red Conveyor Dryers, Leather Finishing and Drying Machines, Complete Special Purpose Conveyors designed and Manufactured to Order.

Gardner Hardness Tester	A simple device for holding the Wilkinson pencil (or phonograph needles), so that more uniform results are obtained.
Du Pont Scratch Testing Machine	Sample is drawn under weighted needle until sufficient weight has been added to pierce the film. When coating is penetrated, electrical contact is made with metal panel and a signal bulb is lighted.
Schopper Hardness Tester	Similar to other scratch testers, but has means for automatically increasing load.
Sheppard-Schmitt Scratch Dynamometer	Scratch is produced by hardened steel point shaped to an inverted tetrahedron of 45 deg. Sample drawn forward as load increases.
Microcharacter	Similar to Sheppard-Schmitt tester except that cutting tool is a diamond, ground in the form of a solid right angle; that is, the corner of a cube. The diagonal of the cube is mounted perpendicular to test surface.
Parker-Siddle Scratch Tester	A simple form of Schopper type, in which load on the needle is increased as the scratch is made. The point of the needle is in the form of a hemisphere, 0.2 mm. in diameter.

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust.



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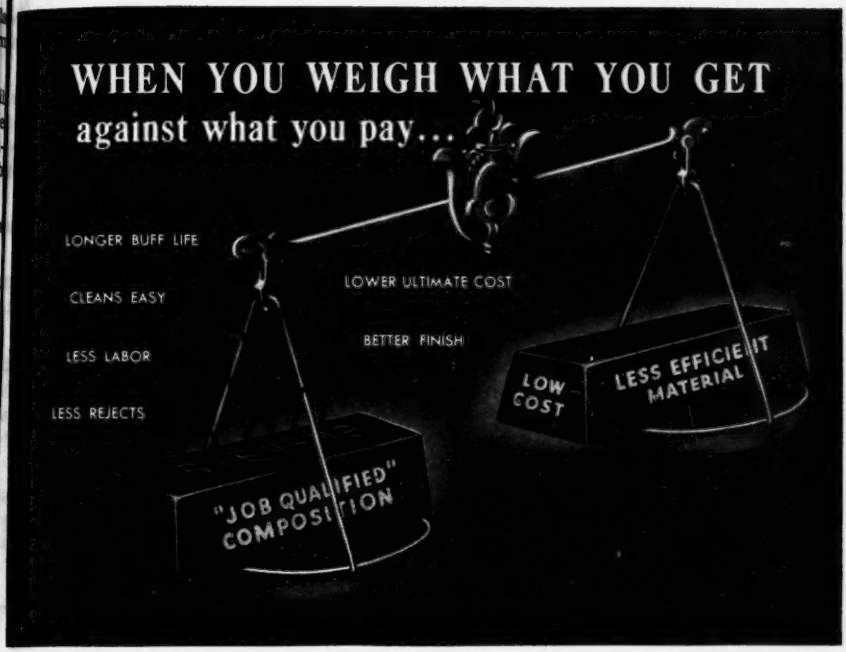

the balance is in favor of Stevens "Job-Qualified" Composition

The cost of buffing and polishing materials is an important factor in metal finishing and it would be wise to remember that very often the use of low-priced material may prove to be expensive in the long run. Savings involved in buying a barrel of "cheaper" composition may very quickly be wiped out by losses due to increased buff wear, rejects, extra cleaning costs, lost man hours—to say nothing of unbalanced output schedules.

On the other hand it would be equally foolhardy to buy only the highest priced materials without first checking composition performance on the job.

Since it is impossible to production-test every product offered, you are faced by the problem of selecting a buffing or polishing composition that is "Right" for *your* work. At this point, we suggest that you call in a Stevens sales and service representative. He is particularly well qualified to recommend from Stevens' broad range of job-tested, service-proven compositions the one or more specific grades formulated to answer your specific needs. Better finish, easier cleaning, longer buff life, less rejects and increased production are characteristic money-saving advantages of Stevens "job-qualified" compositions.

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Twisting Cork Tester	A cork stopper is placed at the lower end of a vertical rod which may be easily weighted and then twisted through any desired angle.

The results of scratch hardness tests are expressed as relationships between the force applied and the rupture effected. Scratch testing is also utilized as an indicator of adhesion values.

METHOD II—PENDULUM HARDNESS

Walker-Steel Swinging Beam	A swinging beam, consisting of two ½-inch steel balls attached to No. 28 drill rod arms, is caused to oscillate on the film. The amplitude of the oscillation is observed; the time necessary to effect a 50 per cent decrease in amplitude, divided by the time required to effect the same decrease on a glass panel, gives the pendulum hardness number.
Sward Rocker	A simplified pendulum device, consisting of two flat rings leveled by means of a circular level at the bottom, is set in motion on the film. The amplitudes of the oscillations are indicated by two tube-style levels in the lower half. The Rocker value is the number of complete oscillations multiplied by 2; or the time elapsed during complete oscillations.

METHOD III—INDENTATION RESISTANCE

Pfund Hardness Meter	A device for measuring the load required to produce a specific indentation by a spherical tool. Diameter of impression is measured by means of a micrometer eye-piece while the tool is in contact with the film.
Imprint Resistance Tester	A piece of felt is cemented to bottom end of solid cylindrical bar, and a piece of smooth cheesecloth is placed between the weight and the surface being tested. Print resistance is the load required to make an impression within a given time, or the time required with a given load.

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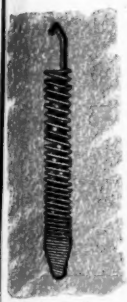

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PIONEER OF A BETTER WAY IN PLATING

METHOD IV—IMPACT RESISTANCE

Parlin-Du Pont Impact Tester	Impacts are made by dropping weighted hammers on a variety of impact tools. The panel is supported on a ring-shaped anvil just below the tool, and resistance is measured by scraping the loosened film and determining the diameter of the exposed area.
Camp Impact Tester	Three differently shaped tools are dropped through a guide tube onto separate areas of the test panel. Result of impact is scored from a prepared chart which gives numerical values to the observed results for each tool.
Bell Laboratories Impact Tester	Test panel is struck a series of glancing blows by a case hardened ball. By means of a transparent calibrated scale superimposed over the impact pattern after the test run, the energy of the blow at which the film is shattered is determined.
Hart Impact Tester	Test panel is clamped to base with rubber sheet acting as shock absorber. The hammer is raised to vertical position and allowed to drop. Adjustment of height at pivoted end of hammer allows for vertical or glancing blows.

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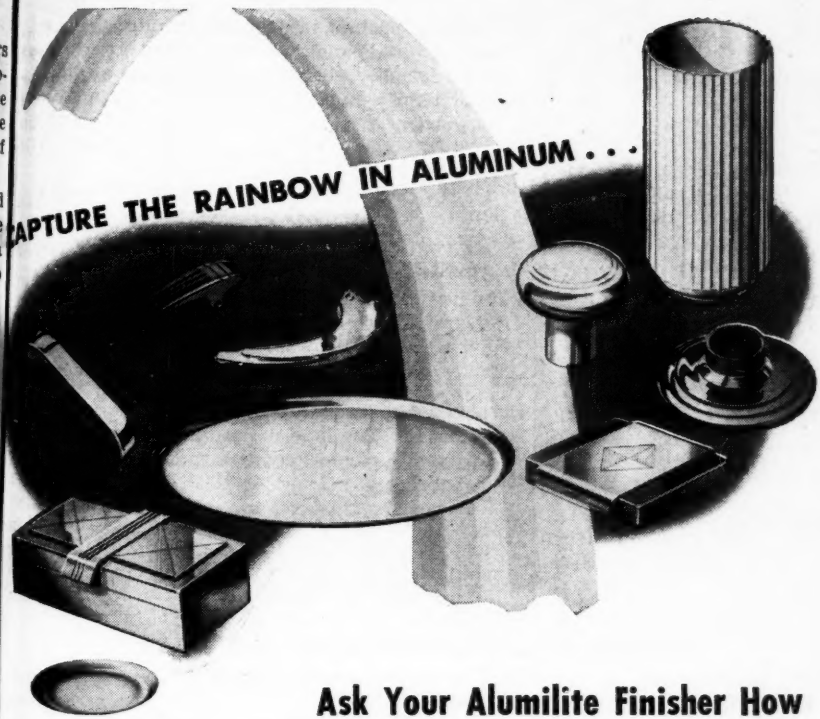

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Ask your nearby licensed Alumilite finisher to show you the colors and finishes he can achieve with the unique Alumilite finish that can be applied only to aluminum. If you don't know the name of the Alumilite licensee nearest you, we'll gladly introduce you. Write to ALUMINUM COMPANY OF AMERICA, 621 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in 55 leading cities.

ALCOA ALUMINUM

G. E. Method	A 1-inch steel ball is dropped through a vertical tube onto a panel which is fixed at an angle of 45 deg. Resistance is determined by number of times ball must be dropped before film chips or ruptures.

Impact devices are also used for adhesion tests.

Methods V and VI are based on the concept that hardness is the resistance which a film offers to deformation.

METHOD V—TENSILE STRENGTH (DETACHED FILMS)

Gardner-Parks Distensibility Tester	Detached film is pulled vertically between two jaws of motor-driven machine. Results are calculated on the load in kg. per square centimeter. Scale reads in per cent elongation.
Rumpometer	Detached film is clamped vertically between two containers. The load is produced by water flowing from upper to lower container. Elongation is read directly.
Scott Tester	Standard tensile strength machines, obtainable in various sizes and for materials of varying strength. Light duty machines are used for testing detached films.

METHOD VI—OTHER DISTENSIBILITY TESTS

Bell Laboratories Distensibility Machine	Test panel is fixed horizontally between two motor-driven clamps and pulled at rate of 0.6 inch per minute, until the film cracks or peels. Observation is made with low power microscope.
Fuller Distensibility Test	Organic coating applied to rubber strips, one end of which is tacked down while the other end is hand pulled. The surface is observed for checking, and results are expressed in per cent elongation at which unmistakable checking is observed over most of the band.

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Mandrel Test—Rod	Test panels are bent over rods of varying sizes and results are reported by indicating observation of film after testing with specific diameter rods.
Mandrel Test—Cone	Test panel is bent around a cone-shaped tool so that coating is elongated at increasing values from the base of the narrow end. Coating is observed after test, as in rod method.
Erichsen Film Test	Test panel is clamped horizontally and then indented with a steel ball under slowly applied pressure. Results are indicated by the distance the ball travels and its corresponding effect on the film.

METHOD VII—RESISTANCE TO ABRASION

Gardner Abrasion Test	The abrasive material, No. 50 emery powder, is dropped through a six-foot tube onto the test panel. The weight in pounds of the constantly falling emery needed to cause disruption in the film is recorded as the abrasion value.
Bell Laboratories Abrasiometer	Carborundum air blast impinges on the test panel which is held at the nozzle exit at an angle of 45 deg. Results are reported in the weight of abrasive needed to wear through a unit thickness of the film.

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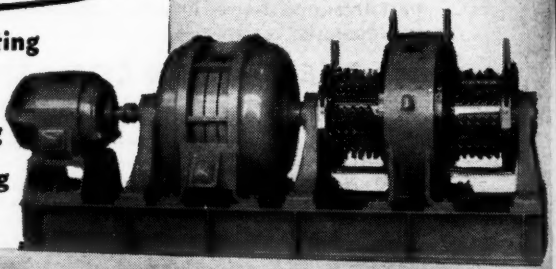

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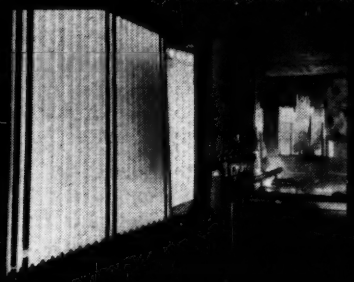

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In Finishing Production . . . the Future Belongs To Men Who *Plan* For It!

Hercules Powder Company Abrasiometer	Similar in most respects to the Bell Laboratories device. Main difference is in the design of the nozzle.
Bell Laboratories Rotating Disc Abrasion Test	Sample panel consists of a wood or metal disc fastened to the end of a vertical shaft, and rotated in a vessel filled with fine sand. The amount of film material lost during the test is the measure of the resistance to abrasion.
Parlin Abrasion Testing Machine	Abrasive tipped tool is rubbed across test panel by means of a motor-driven carriage. The number of oscillations required to wear through the film is recorded by an automatic counter.
Camp Abrasion Method	Test panel is fastened to horizontal turntable which is rotated at approximately 30 r.p.m. Abrasion is performed by circular rubber ink eraser. A revolution counter records the number of revolutions required to wear through the film, and the machine is stopped automatically when copper tracer makes contact with metal panel.
Taber Abraser	Similar to Camp device. The abrading wheels may be renewed by dressing on special abrasive paper discs. Turntable revolves at approximately 50 r.p.m.
Traffic Paint Abraser	A heavy duty machine using a 12-inch rubber tire as the abrading wheel. Sample panel contains area coated with standard paint so that results can be compared as test progresses.

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MANUFACTURERS OF INDUSTRIAL FINISHES

Dorry Abrasion Machine for Traffic Paint	Crushed quartz is used as the abrasive and the machine is run through 500 revolutions. The loss of weight is recorded as the abrasion factor.
Wolf Abrasion Machine	A leather disc on the end of a rod scribes a circle on the film being tested. The loss in weight per 100 cm.^{2} is the abrasion factor.
A.S.T.M. D658-44 Air Blast Abrasion Tester	The amount of abrasive required to wear through a unit film thickness when the abrasive impinges on the coating at a uniform rate under the action of a controlled air blast is given as the measure of abrasion resistance. It is found by subtracting the weight in grams of the abrasive material in holder after the test from the weight in holder before the test and then dividing by the thickness of the coating in mils.

It is obvious that a number of these testing devices give indications of properties other than hardness, and to avoid confusion, results are usually indicated by the type of test rather than the indefinite term. The headings used to segregate the various types in this listing are recommended; the term "hardness" should never be used unless qualified by the specific determination method used.

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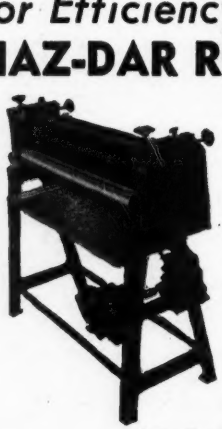

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Finishing Clinic

In this department are presented some of the questions submitt by readers together with suggested solutions of the proble outlined.

Question. *We would appreciate advice concerning the removal of rust from conveyor chain by some means other than through the use of an acid solution.* *F.Z.*

Answer. For one solution to a problem which appears to be similar to yours, we would refer you to the article "Simple Brushing Setup Descales Conveyor Chain" published in the February 1948 issue of PRODUCTS FINISHING, p. 92.

——— fc ———

Question. *Our shop has a problem in brass finishing. We would like to know how to prepare a brass surface prior to lacquer spraying so that the finish under the lacquer will not tarnish.* *W. D. K.*

Answer. The tarnished condition that you mention is quite often evident in the finishing of castings wherein small holes or occlusions become filled with moisture and cause discoloration after the lacquer has been applied. The factor of humidity is one cause of nish, so that if possible the b should be finished in a room in w the humidity is kept low. It is fur advisable that the operation prio lacquering should be performed wi very dry buff and the work should immediately be lacquered. The use dipping lacquer with a very low ba temperature might also assist yo overcoming your difficulty. F. W.

——— fc ———

Question. *Could you furnish na of any firms providing industrial plays for use in schools in connec with an industrial arts program?* *J. P.*

Answer. We suggest that you tact the Pittsburgh Plate Glass Industrial Paint Division, Pittsbu Pa.; Binks Manufacturing Co., 31 40 Carroll Ave., Chicago 12, Ill.; The DeVilbiss Co., 300 Phillips A Toledo 1, Ohio.

There are two magazines wh

ight be able to furnish you more spe-ific information; namely, Prakken ublications, 330 S. State St., Ann rbor, Mich., and School Arts Maga-ine, Davis Press, Inc., 44 Portland St., orcester 8, Massachusetts.

——— fc ———

Question. *We would appreciate more information concerning the new method for hot dip tinning reported in PRODUCTS FINISHING.*

M. R.

Answer. The two processes recommended for commercial use by the Tin Research Institute are the chloride process and the nitrate process.

The chloride process involves immersion of 2-3 minutes in a molten chloride bath (572-662 deg. F.) of the following composition:

Zinc chloride ____82 parts by weight
Sodium chloride __18 parts by weight

The castings are transferred to the tin pot (572 deg. F.) straight from the salt bath, where they are allowed to remain for 3-5 minutes. If a specially bright and corrosion resistant tin coating is required, the casting from the above pot may be transferred to a second tin pot (464-482 deg. F.) for a short dip.

The nitrate process involves the immersion of the casting for 10-15 minutes in a fused nitrate bath (662-752 deg. F.) consisting of:

Sodium nitrate ____1 part by weight
Potassium nitrate __1 part by weight

You are probably aware that special care must be taken in using fused nitrates, which react violently with organic matter. The casting is generally pickled in an inhibited acid pickle prior to the salt bath treatment, and the oxide film produced by the salt bath treatment can best be removed by pickling in 10 per cent (by volume) hydrofluoric acid (caution) following which the casting is tinned using ordinary flux. The nitrate salt bath treatment oxidizes the surface graphite in the casting and produces a film of oxide on the iron.

The new fused salt bath processes are reported to be suitable for cast iron having a carbon content below 3.5 per cent and a silicon content below 2.7 per cent. The nitrate process is believed to give the highest adhesion values. The chloride method is preferred for tinning by wiping and is satisfactory for dip tinning when castings are sound and well cleaned mechanically. In both cases the tin coatings produced are smooth and continuous and closely approximate the quality of hot dipped tin coatings on mild steel.

A. G. G.

——— fc ———

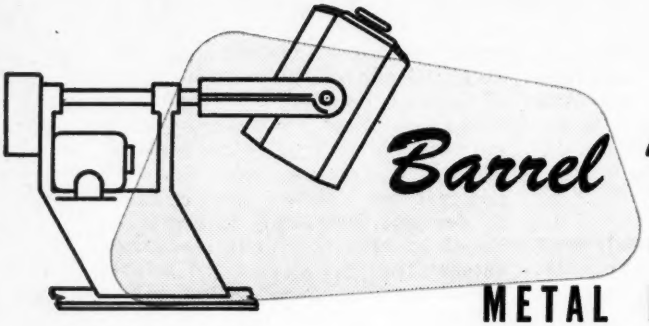
Question. *We are interested in electrolytic tin coating for aluminum pistons for the purpose of initial break-in to prevent scuffing of the aluminum on cylinder walls of internal combustion gasoline truck engines. Do you have any information available on the proper procedures of electrolytic tin, including precleaning, plating bath makeup and control, proper thickness, and so on?*

C. W. H.

Answer. To plate over aluminum it is first necessary to deposit a thin surface film by immersion. Patents for solutions used for this process are held by the Aluminum Company of America and Enthone, Inc.

We are enclosing an article on the subject of tin plating which appeared in the March 1947 issue of PRODUCTS FINISHING.

Relative to the question of thickness of deposit, we would suggest that this is a matter of the clearance between the piston and the cylinder wall. From a wear standpoint, a thickness between 0.0005 inch and 0.003 inch would be adequate, the exact figure being influenced by the surface finish of the cylinder walls.



Barrel Finishing of METAL PRODUCTS

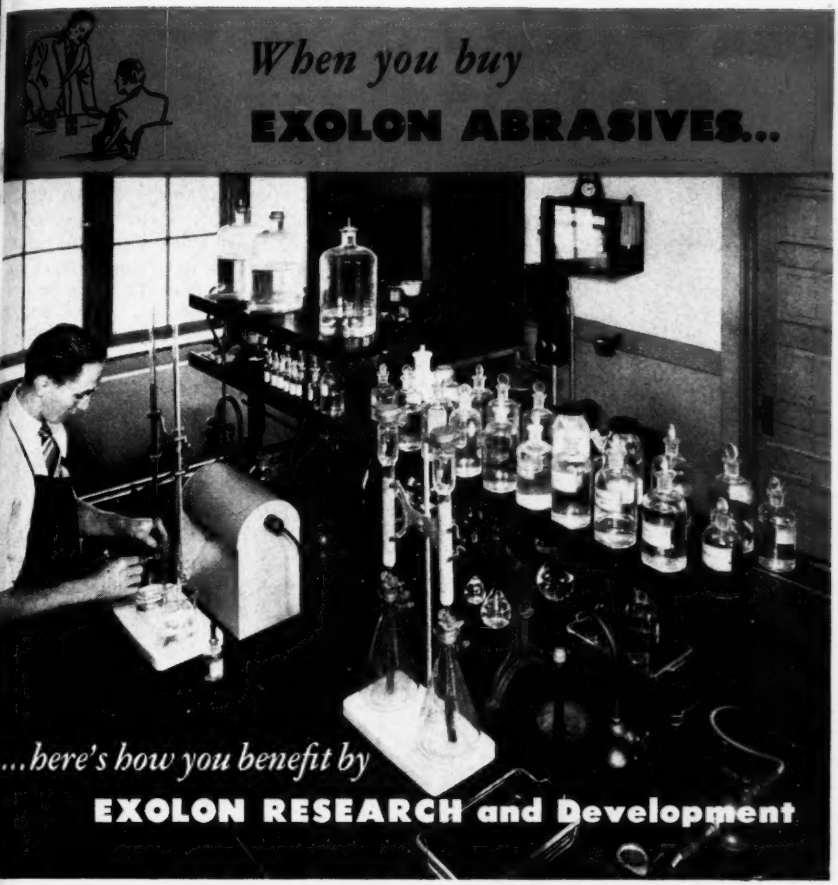
Part 27—The Creation of a Barrel Finishing Laboratory

By H. LEROY BEAVER
Beaver Barrel Finishing Research
Lansdale, Pennsylvania

FROM the very beginning of this series of discussions on The Barrel Finishing of Metal Products, which started in the February 1937 issue of PRODUCTS FINISHING, I have always used the editorial "we," but this time it will be departed from because I want every one who reads this to please consider it in the same sense as though it were a personally dictated letter, pen signed by me and mailed to you under first class postage. The subject has to do with the establishment and operation of a Barrel Finishing Laboratory.

One could not engage in experimental work in barrel finishing and prepare for publication the vast amount of data contained in the already published eighty-seven papers without having all manner of questions put to him. One of the outstanding of these has been, "Can we come over to your laboratory at some convenient time to run some tests on our parts?" Still another is, "How can we know which kind of barrel and materials are the best for our production?"

The answer to the first question has always had to be that I have no laboratory as such, and on occasions where I wished to arrive at determinations using a particular type and size of barrel I have had to depend on some of my manufacturing friends for the use of their equipment. I have often felt that this was presumptious to a very great degree but one of these friends clarified this for me very nicely when he said, "Don't feel that you are under any obligation to us for the use of our equipment and time. We have learned a lot from your experiments here in our factory and we know that on anything new that you develop we will be right in on the ground floor." The fact remains however that many of those asking to visit me want to be personally present when the experimental work is being done so that they can observe every minute detail of the selection of barrel type and size, of materials and operating procedure. Obviously, I am not free to invite all those interested in the experiments to visit the several cooperating manufacturing plants. For my own work, I use what I have previously described to



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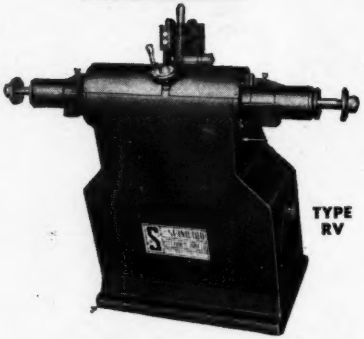

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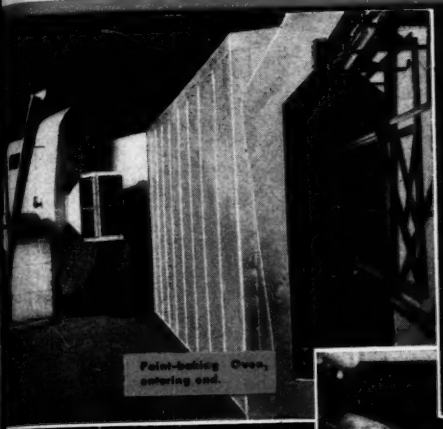
you as kanakin wood barrels. I have learned to evaluate the results obtained by these experimental runs when applied to the larger sized production barrels. To watch me run one test after another would hardly be interesting to anyone who wanted to see the work carried out in full size barrels, especially so when many of these tests run for several hours.

Then there are the constantly recurring questions, "Where does barrel finishing leave off and polishing and buffing take over, or vice versa," and "Should it be attempted to use barrel finishing only, or a combination of barrel finishing and polishing?"

It isn't easy to find two manufacturers or two finishing department supervisors who have identical ideas as to what constitutes a finish on their parts. What might be entirely acceptable to one might well be entirely unsatisfactory to another. When I complete a test run, even though I try to prepare a report in the most minute detail, it seems that there are always questions left unanswered. This condition is not peculiar to me because barrel manufacturers tell me they have the same trouble. However, in a laboratory set up where the official in charge of finishing in a given plant is personally present and takes part in the experiments, he will know every detail as to the selection of barrel type and size, as to operations used, and as to the selection of the most adequate finishing materials for use on his parts. Furthermore, when a finish satisfactory to him has been achieved, he will be able to return to his own finishing department and duplicate the results secured in the laboratory.

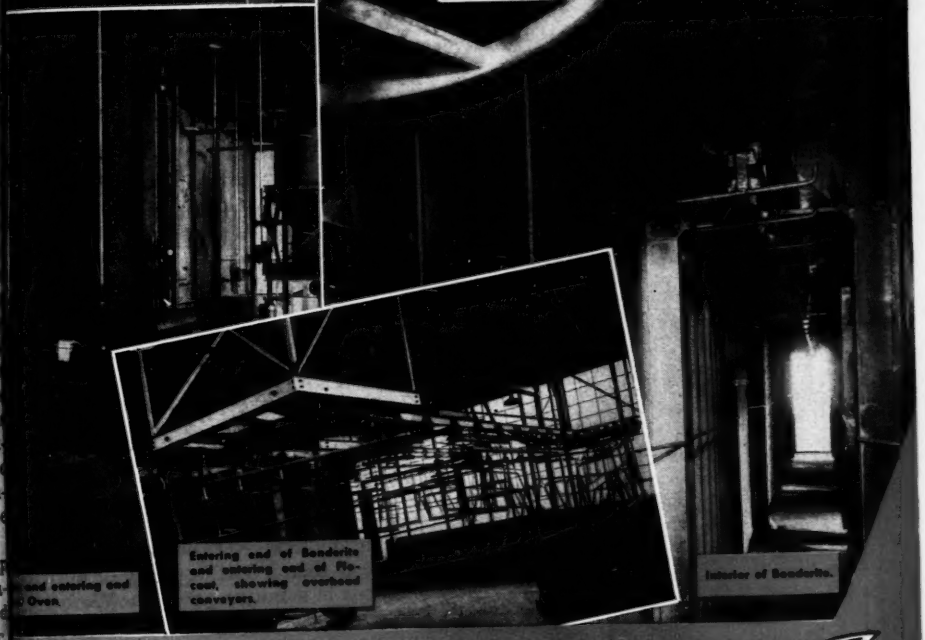
Then too, this laboratory setup would have a more comprehensive variety of the finishing materials used in barrels, both mineral and metallic, than any individual barrel manufacturer would conceivably maintain in his experimental demonstration de-

ted FINISHING EQUIPMENT!



Paint-baking Oven, entering end.

Flo-coat, unloading end.



Entering end of Bonderite and entering end of Flo-coat, showing overhead conveyors.

Interior of Bonderite.

end entering end Oven.

TERS-DALTON Inc.

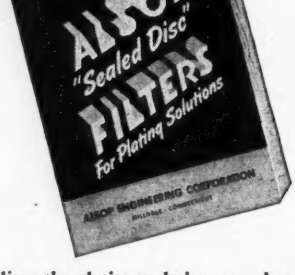
RYAN ROAD • DETROIT 12, MICHIGAN

partment. Some operations may be most successfully carried on with the use of minerals, other with metallic materials and again others with a combination of the two. There are many cases where the preliminary or roughing-out work is best done with minerals, and the final or burnished finish secured with the conventional hardened and polished metallic materials. If all of these facilities were grouped on one floor, the most accurate determinations could be reached and we would know in each case just how far minerals could go before metallic materials should take over, or whether the work might best be accomplished with minerals alone or with metallic materials alone.

There are groups to whom such a laboratory setup should have a special appeal, and I have particularly in mind the Research Committee of the American Electroplaters' Society. I have, as many of you know, appeared as guest speaker before many of the branches of this society, and from the questions raised in discussion, I could sense that something in the way of a central place where barrel finishing determinations could be made was definitely needed. Members of the A.E.S. Research Committee have asked me repeatedly why something could not be done to secure a greater clarification of barrel finishing procedure as respects the results to be secured by barrel finishing operations both prior to and subsequent to the actual deposit of the electroplate. This proposed laboratory would be available at all times to this committee so that the results of experimental work along with the recommendations of the committee could be passed along to the entire membership.

The laboratory would also be available to the Electrodeposition Section of the National Bureau of Standards, so ably presided over by our good friend of many years, Dr. William Blum. The Bureau, so far as I know, has never had a barrel installation of any kind, and yet it should be important for Bureau research workers to know what operations should be performed on parts prior to plating and also what would be the best after-plating procedure. I have in mind the effect of an adequate barrel finishing operation to cold work the plated surface to close the ever present pores. The laboratory would be available to the Bureau in preparing samples to be set up on exposure panels so that accurate findings could be made with respects to the value of barrel finishing in improving the protective value of electroplated surfaces. From all that I can gather it seems that porosity of plated surfaces is a major problem. We have come to the point where simply a "pretty" finish is not enough; the stability of that surface to resist both corrosion and wear is demanded by the ultimate user.

Get your copy



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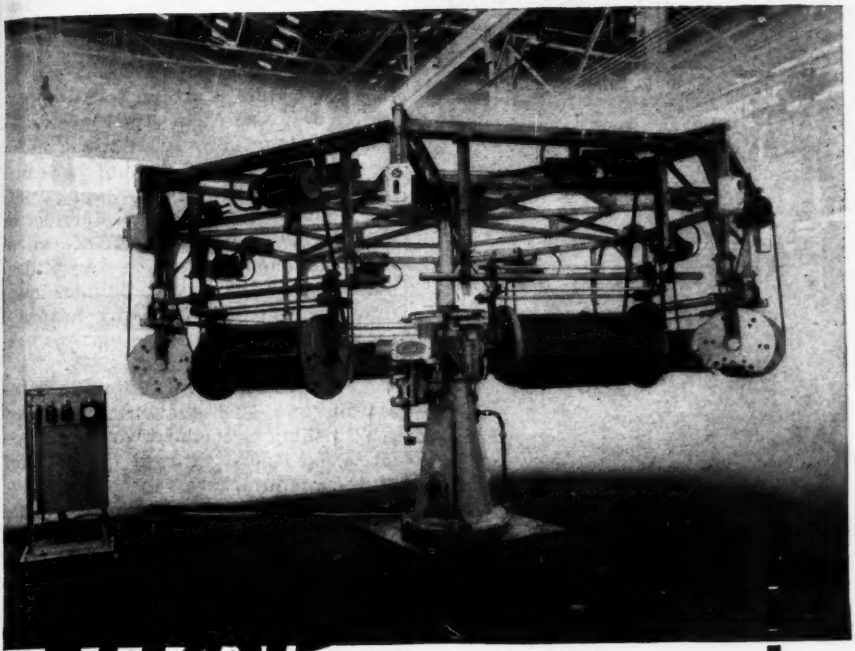

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FACTS ABOUT BARRELS. Standard barrels are available and special designs will be made as required. Can be used for both acid and alkali solutions and also for high temperature salt bath treatments.

Barrels are rotated when in and out of tanks by means of V-belt or gear drives, with separate push-button controls for each barrel.

Both barrel work and racked work can be conveyed on the same machine and different voltages for each can be automatically obtained. An adjustable dwell period at the high position permits the continuously rotating barrels to drain completely before indexing begins.

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The Bullard-Dunn Process removes scale and oxide from ferrous metallic surfaces without attacking the work. Fast . . . thorough . . . economical . . . simple to operate. Investigate. Bulletin MM-BD-46 tells the story.

The DUST-ALL
TACK RAG
Collects Dust and Dirt Too!

DUST settles on surfaces and unsatisfactory finishes result. The *Dust-All* Tack Rag collects Dust. It is the quick economical means to assure good finishes.

Get the *Dust-All* Tack Rag in the Red Checkered Bag at your Dealers or write us.

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The American Society for Metals should have an interest in knowing the best procedure to use on a broad variety of parts of many metallic combinations. Here, too, is a broad opportunity for American Foundrymen to develop some definite program as to type and size of barrels, materials and procedure for barrel processing casting and forgings whether ferrous or non-ferrous. Perhaps I can see all of these various factors with a great deal more clarity than the individual manufacturer due to the many letters I receive from all of these various segments of the finishing field.

You would naturally think that the setting up of such a laboratory on barrel finishing procedure would not excite even casual interest on the part of the manufacturers of buffing and polishing equipment. Let me quote for you some extracts from a letter I received from one of our most important makers of polishing lathes and equipment:

"We make polishing machinery. We wish to make a study of all finishing methods, particularly those that can be carried on successfully and competitively through barrel finishing, and thus avoid seeking business in fields where our polishing machinery does not fit.

For your information, we are constantly in receipt of samples here from manufacturers of a great variety of articles, and if our engineers knew more about what could be done by the barrel method, we would be saving ourselves considerable time and expense in the processing of these samples by our machines.

In general, we of course recognize that the barrel method is best suited for small parts but occasionally we find larger parts that can be processed at less cost in a barrel than on any machine of our own or other construction."

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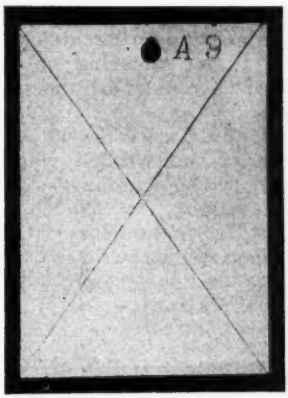
ALUMINUM
PROVIDES THE UTMOST IN METAL AND FINISH PROTECTION
A New Order of Durability



This aluminum panel was Alodized and then finished with one coat of white baking enamel. After **20,000 hours** of exposure to corrosive salt spray, the Alodized and painted aluminum is still in A-1 condition.

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Granodine *
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The Coating

"Alodine" produces a thin, tough, tight, skin-like coating firmly embedded in the aluminum. This protective skin is extremely resistant to corrosion and bonds paint firmly to the metal for the life of the finish.

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Alodizing is simple, quick, economical, easy to operate and effective. "Alodine" can be applied by immersion, spraying, or brushing. It can be utilized to advantage in your own production. Write or call for the new descriptive folder on "Alodine".

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I would like to think that the attitude of this particular maker of polishing equipment represents the general attitude of all. I have talked with many of them, and note that they realize that each finishing procedure has its own particular field. It is the determination of the dividing line between barrel finishing and polishing that will require a lot of experimental work before much in the way of a definite, acceptable ruling may be established. It is in determining this dividing line that a barrel finishing laboratory could and would be of the greatest service.

There have been some who seemed sure that a setup that had on one floor one each, at least, of every kind of barrel available to the American manufacturer would never get the approval of barrel manufacturers generally. Thus far I have talked with three barrel manufacturers, and strange as it may seem, all of them favored such a laboratory setup. One of them suggested that he would be glad to supply two barrels on what he termed a "lend-lease" basis. Not only that, but he also asked me whether he could not arrange for me to process the parts sent in by customers for a demonstration finish.

What would this laboratory cost the average manufacturer asking for determinations? I hope the answer can be, "Nothing except your good will." Down through all the years in which this research has continued I have asked nothing from the American manufacturer save the opportunity to be of service. All of the expense has been borne from my own personal funds and no barrel maker or maker of barrel finishing materials has ever been asked to contribute a single penny, even though some of them have offered to underwrite a part of the expense if the load became too heavy for me to carry alone.

In carrying on a work of this kind an infinite variety of materials is tried in an effort to find the best for a given operation. This has been a part of this continuing effort. It is hoped that when a new line of materials—and it is new—is announced that the profits deriving from the sale of the materials will take care of the operating costs of the venture. I am not set up to carry a long line of individual accounts and it is neither right nor proper that I should, because the products that will be available should be marketed by our responsible recognized plating supply houses. It would be your support in the purchase of these materials that would make the operation of the project possible.

I have known the officers of many supply houses for many years and I believe that all too often, too little credit is given to them for their efforts. Your platers' supply house performs many free valuable services which would cost you much in time,

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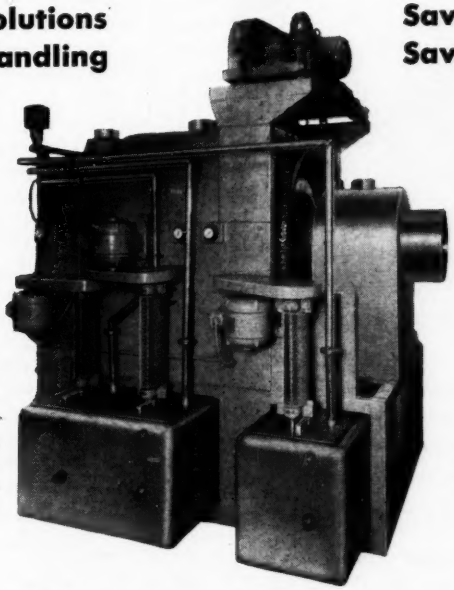

Each operation independently adjustable 0 to 30 minutes. Entire process 5 to 60 minutes.

Can be built for any capacity with any number of solution tanks.

The fundamental advantage is that the work stays in the drum of the RANSOMATIC while work is subjected to a continuous automatic cycle of any number of solutions and rinses. Each process independently and accurately timed according to requirements.

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effort and money were you required to do them yourself. This proposed laboratory would be available at all times to all of the supply houses and their field representatives to assist customers in determining the equipment, materials and methods best suited for their requirements.

The barrel manufacturers themselves realize that there is no one kind and size of barrel that could be considered as the "best" barrel for every conceivable purpose. None of them would knowingly want you to buy a barrel unless it was completely adequate for your barrel finishing requirements. They know that a satisfied customer constitutes a solid stone in their business foundations.

There is just one way that I can learn of your approval or disapproval of this proposed Barrel Finishing Laboratory, and that is by your writing me a letter to tell me just what you think. I hope that a great many of you will do just that and that you will be quite frank in expressing your opinions or offering your suggestions. Whether the letters come from presidents of companies or from operators of barrels in the finishng departments of a factory, or indeed from any source interested in the development of barrel finishing practice, they will all be appreciated.

Rhodium, which possesses greater whiteness and reflectivity than the better known and more abundant platinum and palladium, is an ideal metal for surface finishing as it does not discolor and it resists wear. Although rare and costly, the simplicity of plating operations, plus its ability to do the job with a remarkably thin deposit, bring unit costs into reasonable ranges. Inexpensive costume jewelry and cigarette lighters utilize rhodium finish. Other examples range from rhodium-plated watch movement parts to finished arc light reflectors.

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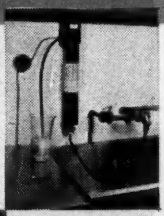
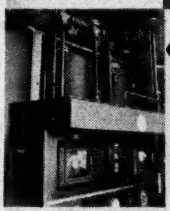
Models as small as 5 gph . . . as big as 1,000 gph, with various sizes in between . . . are in stock, available immediately.

Specially-built designs, too . . . in any size. (See below.)





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A **FILT-R-STIL** Demineralizer makes use of tap water an extravagance that is paid for in inferior, varying quality of the finished product. So, if you're economy-minded . . .

GET ON THE FILT-R-STIL TEAM. A FILT-R-STIL Demineralizer may pay for itself in a matter of months. Then it will pay *you*—in added profits—for years to come.

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Finishing Progress

Finishing Developments of 1948 In Review

AT this early part of the new year we believe it appropriate to review some of the finishing highlights of 1948—trends and developments in all phases of metal finishing as reported at numerous scientific meetings and recorded in the technical literature—which are of interest to the production man concerned with the efficiency and quality of metal finishing operations.

Surface Treatment

The technical developments of the past year placed renewed emphasis on the importance of surface preparation in the finishing cycle whether the coating to be applied be of metallic or organic nature. The year's developments have contributed to the growing realization that the chemical and physical nature of a metallic surface has a very marked effect on the quality of any coating applied to the surface. There are many factors which have a part in determining the chemical reactivity of a metal surface.

One of the highlights of 1948, at which some of the relationships between surface chemistry and metal reactivity in finishing operations were discussed, was the "Cleveland Symposium on Surface Chemistry," sponsored by the Cleveland sections of the American Chemical Society, the Electrochemical Society, and the American Institute of Chemical Engineers. At

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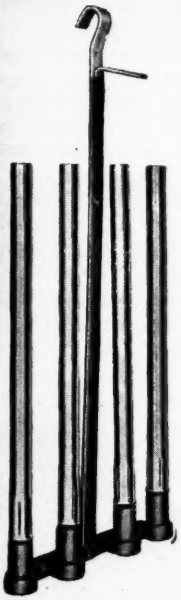

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The remarkable resistance and long life of Paste Rack Insulation is to a large extent due to the Primer coat, which provides adhesion. BUNATOL Primer is a one coat job. A single dip tank and just one labor operation. That means faster work and time saved; plus the saving in actual labor cost.

The Primer does give excellent adhesion to all rack metals. It sticks tight and holds the thick single coat of Paste Insulation down to the rack so there is no seepage or carry over.

Compare! Even if you are now using a Paste Insulation find out about BUNATOL prices; long life quality; and what can be saved in application labor. If operating costs mean anything in your shop then investigate. Full information, sample and prices are yours for the asking.

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BUNATOL

this symposium, Dr. R. C. Gibson, director of research, Parker Rust Proof Company, Detroit, pointed out some of the advances made in the phosphate coating of metals prior to organic finishing. As interpreted by Dr. Gibson, surface conversion coatings are produced essentially by surface corrosion processes, the conditions being controlled to give a specific type of corrosion resistant film. Thus, instead of activating the metal surface, such as may result from acid etching and mechanical blasting, the surface is converted into a more stable and less reactive medium as a base for paints.

Phosphate coatings for use as a base for paints, as a rule, are usually applied after fabrication of articles and immediately before painting, either by immersion of the article in the phosphating solution, or by spraying the solution onto the articles to be coated. One commercial type of phosphating process, developed by the Parker Rust Proof Company and sold under the trade name of "Bonderite," according to Dr. Gibson, is adapted to the production of phosphate coatings on steel, zinc, and aluminum in a single solution, either by spray or immersion applications. Mixed metal commercial articles which are being successfully coated consist of aluminum die castings, permanent mold castings, wrought aluminum alloys, zinc base die castings, cast iron and cold rolled steel. Making possible the use of a surface treatment process applicable to metals other than steel in a single solution has provided an economical method of preparing a combination of metals for painting, which eliminates the necessity of dual equipment.

The past year's annual convention of the American Electroplaters' Society, held at Atlantic City, featured a discussion of some of the factors affecting the formation of phosphate coatings in a paper by Nelson F. Mur-

Production

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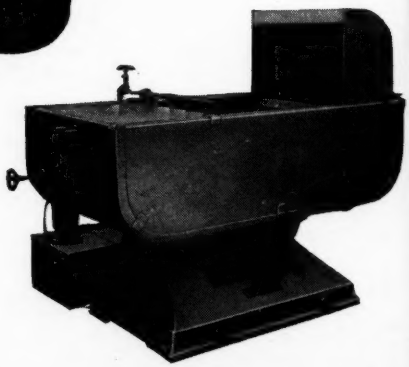
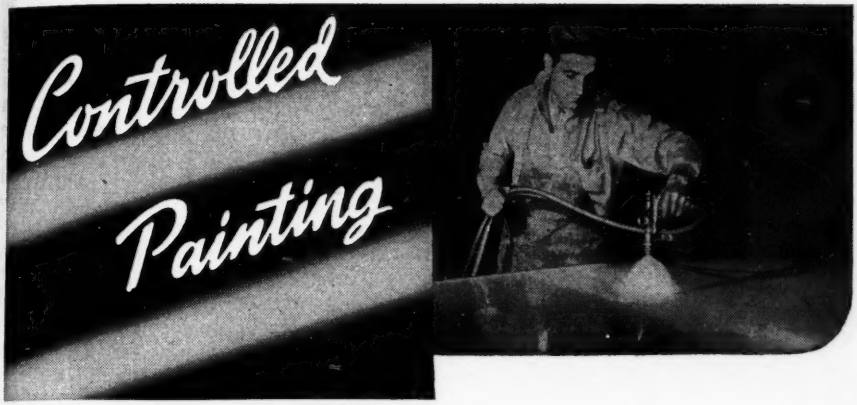


Production MACHINE COMPANY GREENFIELD, MASSACHUSETTS, U.S.A.



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Industrial Finishing Company, of Long Island City, uses Eclipse Spray Equipment to apply a vinyl resin peelable coating to stainless steel as a protection against scratches and other damage to the steel while die cutting, stamping or drawing.

1803

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ECLIPSE
Manufacturers of Low Pressure Spray Equipment Since 1908

phy, research professor in chemical engineering, Virginia Polytechnic Institute, and Michael A. Streicher, Lehigh University. The authors brought out experimental data which emphasized the importance of control of acid ratio in phosphating.

The "acid ratio" in phosphate coating baths was defined as the ratio of the concentration of "total acid" present to "free acid." The "total acid" is found by titration of a sample of solution with O.1 N sodium hydroxide using phenolphthalein as an indicator. The "free acid" is found by titration of the same size sample with the same solution of sodium hydroxide using bromphenol blue as an indicator. The phenolphthalein titration result divided by the bromphenol blue titration result is defined as the acid ratio of the solution.

Factors of commercial significance affected by the acid ratio in phosphating of steel products were stated to be (1) the amount of sludge formed in the bath, (2) the time required for formation of a satisfactory coating, (3) quality of the coating, and (4) loss or gain in weight of the treated piece.

The past year has evidenced continued interest in conveyorized methods for application of chemical treatment processes, such as phosphating. Shown in Fig. 1 is a typical spray "Bonderizing" unit utilizing a continuous tunnel, completely enclosed, divided into compartments, where the various steps of cleaning, rinsing, and phosphating take place automatically. Equipment of this type is generally engineered and constructed to fit the production needs of the individual manufacturer.

The modification of phosphate surface treatment solutions to render them satisfactory for conveyorized spray application has made possible an increased degree of efficiency in coating many objects, and particularly for large objects such as refrigerator cabinets and automobile bodies which do not lend themselves readily to immersion coating.

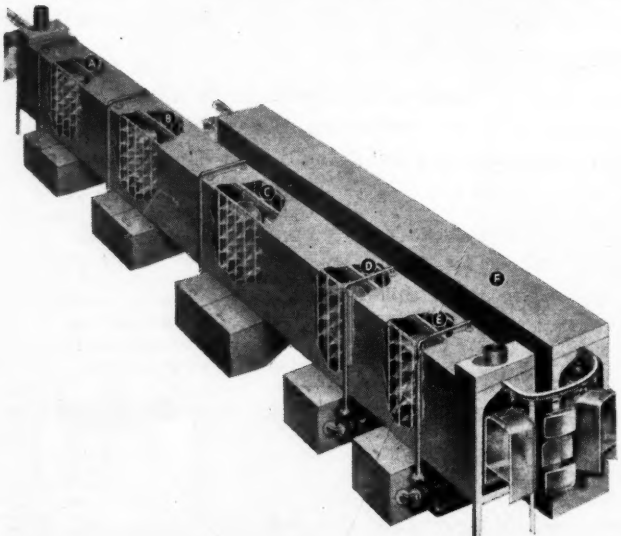
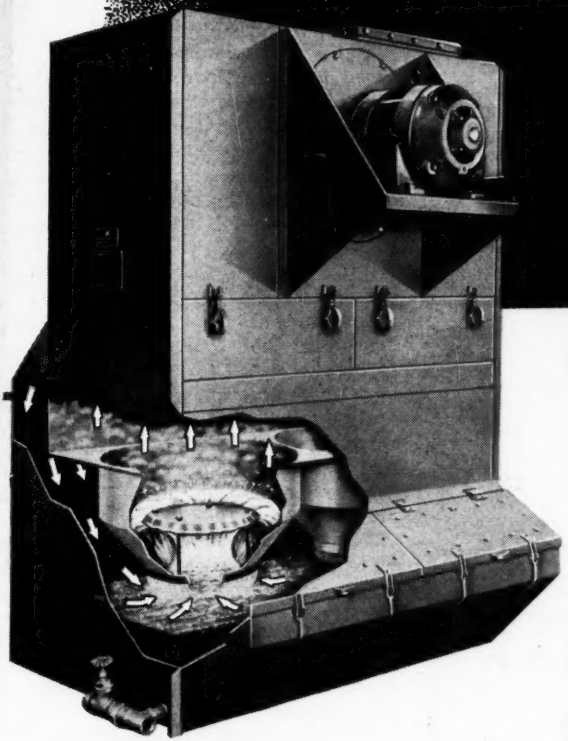


Fig. 1—Typical equipment for spray application of phosphate coatings. The operation is accomplished in a continuous tunnel where the various steps of cleaning, rinsing, and phosphatizing take place automatically. (*Illustration courtesy Parker Rust Proof Co., Detroit 11, Mich.*)

Legend

A—Spray Cleaning
B—Rinse
C—Spray - Bonderizing Section
D—Clear Water Rinse
E—Parcolene Rinse
F—Drying Oven

NEWCOMB-DETROIT



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Uni-Wash Dust Collectors are assembled units . . . installation requires the connection of a power line, water source and drain only. These units are available in capacities from 500 to 30,000 CFM. They may be used individually or in combination to meet the requirements of any dust condition.

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Non-Ferrous Metals

There is evidence of increased interest in surface conversion processes for zinc, magnesium and aluminum. Darsey pointed out in the "Corrosion Handbook," which appeared about the middle of 1948, (John Wiley & Sons, Inc., sponsored by the Electrochemical Society) that because of the reactive nature of zinc, it is ordinarily difficult to obtain good paint adhesion without adequate chemical treatment of the surface. In this connection, it was shown that phosphate coating of zinc surfaces retards corrosion and increases the adhesion and resultant durability of applied organic coatings. Likewise, in the same group of discussions, Anderson brought out the fact that chromate films are widely used on zinc and zinc alloy surfaces. A number of procedures are available by which protective films consisting essentially of chromium salts can be produced on zinc surfaces comprising a number of different manufactured articles. The adhesion of baking enamels to the chromate films was also reported to be adequate.

In the same general discussion, featured in the "Corrosion Handbook," Loose of Dow Chemical Company brought out the fact that chromate type treatments continue to be the most widely used for magnesium alloys, wherein the four most commonly employed were listed as: (1) Chrome Pickle; (2) Sealed Chrome Pickle; (3) Dichromate; (4) Galvanic Anodize. In connection with organic finishing of magnesium parts, one satisfactory procedure that was reported by Kohl to be successful for magnesium castings, in production use, consisted of a dichromate treatment, followed by spraying with a zinc chromate primer, baking and spraying with a wrinkle enamel, and baking. (Materials & Methods, May 1948).

Several reports during 1948 show evidence of interest in factors affecting the properties of anodic coatings on aluminum. Temperature of anodization was found to have an affect on properties of the coating produced; likewise, the abrasion resistance of anodic coatings was found to increase at a rate, almost proportionally, with increase in thickness of the coating. The American Chemical Paint Company has reported that its "Alodizing" process finds application for treating aluminum articles prior to organic finishing operations.

Cleaning

The subject of metal cleaning always finds a place for itself in a discussion of the technical activities in metal finishing for any year, and this past year is by no means an exception. Particular emphasis has been placed on the relationship between the cleaning cycle and the nature of the soils to be removed; tests for determination of

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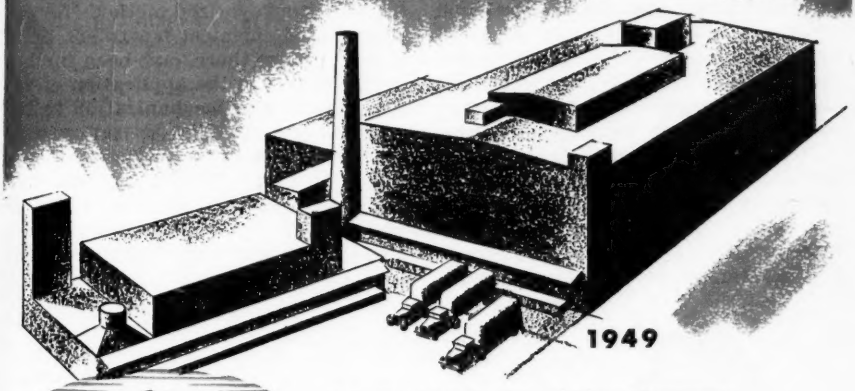

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conditions under which surfaces are chemically and physically clean have also shared the limelight, and have indicated the importance of proper methods of "precleaning," prior to alkaline cleaning operations. In the July, 1948 issue of "Industrial & Engineering Chemistry," published by the American Chemical Society, Irvin Reich and Foster D. Snell of the Foster Dee Snell Laboratories pointed out some of the fundamental effects of surface active agents in metal cleaning operations. It was emphasized that the preferential wetting characteristics of the detergent solution compared with the oil constituents of the soil, as modified by sorption of the detergent or its hydrolytic products, onto the specific soil and surface must always be considered in an approach to cleaning problems.

One trend of unusual interest is recognition of the importance of proper rinsing in cleaning setups. Good rinsing, either dip or spray, is the answer to many cleaning problems. Some valuable pointers in rinse tank design were discussed in "The Iron Age" (April 15, 1948) by J. B. Mohler. The measurement of two factors in metal finishing operations can serve as a basis for efficient rinse tank design and operation: first, the amount of contaminant retained on the work to be rinsed, and therefore brought into the rinse tank; second, the amount of contaminant that can be permitted to remain on the work leaving the rinse tank without detracting from the quality of the finish produced or interfering with subsequent processing operations.

Just as there has been continued interest in conveyorized methods for application of chemical treatment processes, likewise there have been further developments in the application of various degrees of mechanization to the cleaning and pickling operation. One type of metal cleaning machine is shown in Fig. 2. Design of these machines may vary, according to type of cleaner, size and quantity of parts, method of work handling, and the number of operations to be carried on in the machine. In a comprehensive discussion of production processes, as well as machines, for cleaning and chemical surface treatment of die castings, Arthur P. Schulze ("Products Finishing," July, August, September, 1948) provided information on

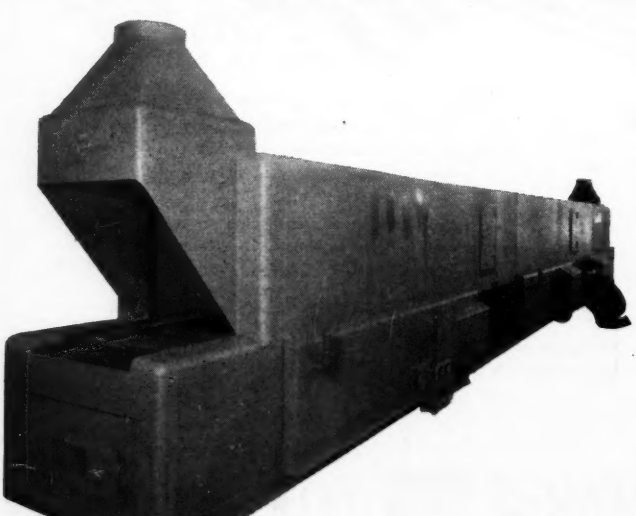

Fig. 2—One type of modern three-stage metal cleaning machine
(Photo courtesy R. C. Mahon Co., Detroit 11, Mich.)

CHROMETEX eliminates grey streaks and clouds often found in chrome plate and greatly aids in completely covering deep recesses of nickel with chrome plate.

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Surface Finish Measurement

The past year provided evidence of increased interest in methods for measurement and specification of surface finishes throughout the metal finishing industry. According to Dr. H. L. Kellner, research director, Lea Manufacturing Company, Waterbury, Connecticut, in speaking before the 1948 regional meeting of the Toronto (Canada) Branch of the American Electroplaters' Society, increased effort is being put into an attempt to develop methods for designating the various types of polished surfaces by concrete values rather than descriptions that might have various interpretations. Among the methods for such measurements that were discussed were photomicrographs, Profilometer, Brush Surface Analyzer, and the surface replica method.

Plating

The developments reported during the past year in plating cannot be reviewed without noting the increased interest being accorded electroplating engineering and the part it plays in the uninterrupted production of high quality plated finishes. A practical method for avoiding roughness in plating copper was described in a paper presented at the annual meeting of the American Electroplaters' Society by R. H. McCahan, E. C. MacKinnon, and D. A. Swalheim, E. I. du Pont de Nemours & Co., Niagara Falls, N. Y.

In this method the cyanide copper plating tank is separated into anode and cathode compartments by a heavy canvas diaphragm and the electrolyte is continuously pumped from anode to cathode compartment through a high efficiency filter. The system makes possible smooth deposits at high plating speeds. This paper was awarded

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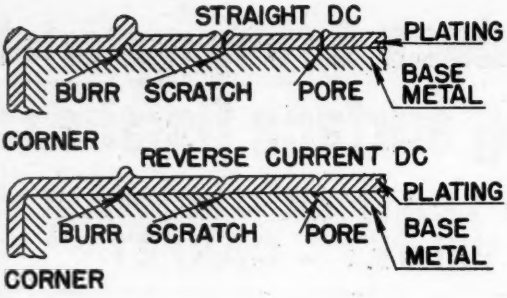

Fig. 3—Cross-sections showing direct current and periodic reverse current deposits
(Illustration courtesy "Plating")

the A.E.S. Founders' Gold Medal, given for the outstanding paper presented at an annual convention.

Bath Purification

There has been continued activity in electroplating solution purification methods, keynoting the principle that for uninterrupted plating operations baths must be maintained at a constant degree of purity. Additional work has been carried out by the Research Committee of the American Electroplaters' Society on the determination of impurities in plating baths and the effect of impurities on the quality of the deposits produced. In discussing the quality of nickel-chromium coatings on steel, as affected by copper impurities in nickel plating baths, Dr. D. T. Ewing, Michigan State College, director of A.E.S. Research Project 5, reported before the Annual Electroplaters' Convention that a significant effect on salt spray resistance of the coatings was noted as a result of the copper impurity.

Developments in methods for purification of bright nickel solutions have continued along chemical lines and low current density electrolysis methods, with the latter being used in many production operations. Work was reported which indicated that trouble due to zinc contamination in one type of bright zinc bath was likely to occur when the zinc concentration exceeds 0.050 g./l. or 50 p.p.m. (Carter, "Metal Industry," London).

Raising the pH of nickel baths followed by the addition of freshly prepared basic nickel carbonate forms a very effective method for chemical treatment. Most electrolytic methods for purification use a current density in the range of 5 amp./sq. ft., making use of a corrugated cathode. When the maximum area of the properly shaped cathodes is used, with proper agitation and current density, rapid purification from metallic impurities such as copper, lead, zinc and iron may be carried out.

Periodic Reverse Current Electroplating

At the 1948 Northeastern Regional Meeting of the Buffalo, Rochester, and Syracuse Branches of the American Electroplaters' Society, Dr. D. Gardner Foulke, Hanson-Van Winkle-Munning Company, described periodic reverse current electroplating, which is generally known as the PR process, as a method of electroplating in which the plating current is interrupted periodically, and the interruption is followed by a short term current reversal. During the cathodic portion of the PR cycle, a microscopically thin film of metal is deposited, which is partially deplated during the subsequent anodic period. A cross-section of a typical periodic reverse current deposit is shown in Fig. 3.

According to Dr. Foulke, alkaline plating solutions have been most thoroughly investigated for periodic reverse current electroplating and the most favorable cycle consists of mak-

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ing the work cathodic from 2 to 40 seconds and anodic for from ½ to 5 seconds. A typical cycle was described as 5 to 1. From the practical standpoint, it was pointed out that current reversal is accomplished by two methods at the present time. First, by reversing the current at the tank and second, by reversing the field of the generator. Oscillograph curves indicate that greater losses are to be expected using field reversal because of slower decomposition and buildup to voltage as against contactor operation.

Engineering the Plating Room

The growth of the electroplating industry and the constant reduction in the cost of handling materials through the cleaning and plating rooms have presented an ever widening field for plating room engineering applications.

S. M. Martin, chief engineer, United Chromium, Inc., in discussing engineering of the plating department at the 1948 Convention of the American Electroplaters' Society, emphasized the importance of considering carefully all the details that go into the planning of a plating plant.

It was brought out by Martin that the layout study is an important phase of the engineering job. A poor layout is not only a mistake but, once installed, it is one of the most difficult and costly things to remedy. Important operations and facilities to be provided for in the overall layout, in addition to the tank and electrical equipment proper, are polishing and buffing, precleaning, racking and unracking, inspection, laboratory control and stripping. With present day high speed and bright plating solutions, the need for solution treatment is very important, and this means special storage and treatment tanks, with necessary pumping, filtering and piping equipment. Rack maintenance, repair and coating facilities should be installed regardless of whether the racks are made in the plant or on the outside. Storage space should also be included.

Continuing our year's-end roundup of developments on engineering in the plating room, another presentation worthy of note was made by W. E. Stadel, George L. Nankervis Company, wherein the subject of d.c. power transmission and piping in the plating room was discussed before the 1948 Northeastern Annual Regional Meeting of the Buffalo, Rochester, and Syracuse Branches of the American Electroplaters' Society. A few of the recent demands placed upon piping requirements in modern plating establishments are proper air agitation, automatic spray rinsing, precise temperature control, proper reclamation of rinses, and in many instances the deionization of water.

In connection with piping, it was brought out by Stadel that one of the engineering problems which must be considered is the heating of solutions.

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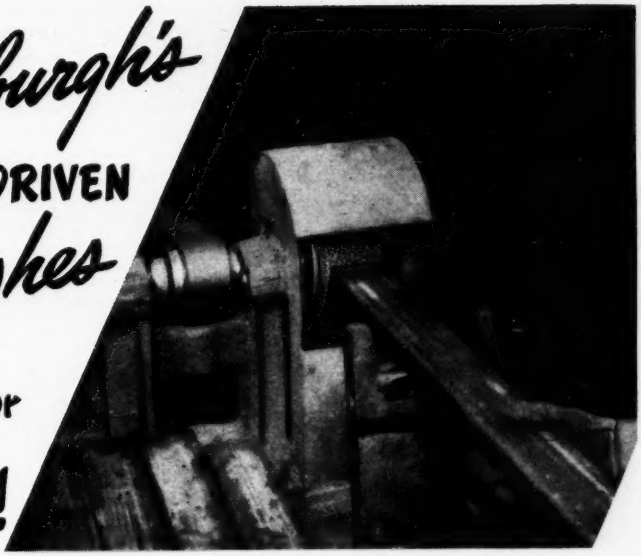

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Plating Racks

The results of experimental work were reported by Stadel in the above meeting which indicated that the scale of 1000 amp./sq. in. in designing plating racks may be too conservative; it was postulated that 1500 amp./sq. in. may be safely used, and 2000 amp./sq. in. is well within reason on some types of plating racks.

A discussion of vinyl resin dispersion coatings brought out the fact that these compounds are finding increasing use as electroplating rack coatings. It was stated by C. W. Patton before the 1948 Cleveland Symposium on Surface Chemistry that the use of these coatings makes possible the application of extremely heavy coatings, in the neighborhood of 0.040 to 0.050 inch, which are resistant to chemical and mechanical damage.

Organic Coatings

In discussing recent developments in organic surface coatings using vinyl resins before the 1948 Cleveland Symposium on Surface Chemistry, C. W. Patton, Bakelite Corporation, New York, brought out the fact that the dispersion type vinyl resins, which are the backbone of the organosol and plastisol type coatings, were first used in large quantities in this country in marine electrical cable filling compounds about five years ago. The particular resin involved was of the vinyl

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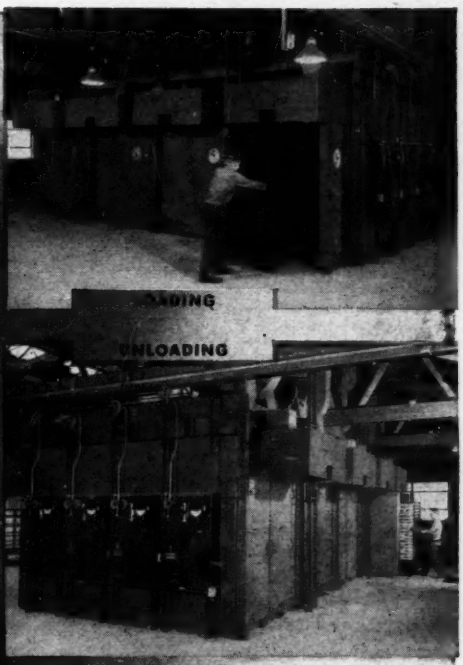

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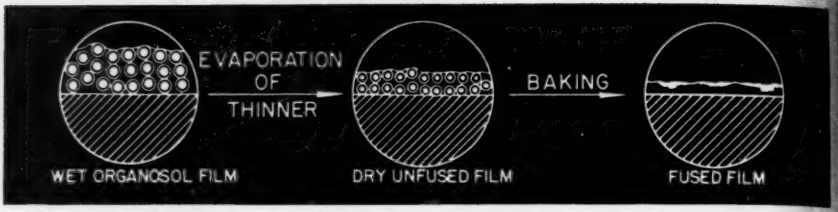

Fig. 4—Illustration of the principles involved in fusion of organosol type coatings (*Illustration courtesy "Canadian Chemistry and Process Industries"*)

chloride-acetate type. Dispersions of the vinyl resins are now available in non-solvents, which can be applied to metal surfaces at relatively high solids content, and the aggregation of small particles left as the liquid phase dries can be flash baked to cause fusion to a smooth film. This principle, which is illustrated in Fig. 4, is finding further adaptation to the application of the still less soluble vinyl resins to metal products.

In the never-ending battle against corrosion, work is in progress to develop satisfactory metal coatings that can be applied to an even wider variety of surfaces. One approach cited in this discussion involved a vinyl butyral resin wash primer, and the blending of a hydroxyl-bearing vinyl chloride-acetate resin in the organosol to obtain adhesion. This type of coating is of particular interest because by the organosol technique, it is possible to obtain coatings of very little plasticizer content which have increased hardness. The economics of such surface coatings for metal products are interesting because, as presented by Patton, (1) the vinyl resins now enjoy a much better price position relative to many other coating materials than they did a few years ago, (2) it is possible to apply thick coatings in one or two operations, and (3) very fast drying and baking schedules are possible.

An early 1948 issue of "The Iron Age" (January 15, 1948) featured a discussion by E. A. Zahn, General Electric Company, of some of the factors which may influence the procedure required in the application of uniform quality wrinkle finishes. It was brought out that heat conductivity characteristics of the metal, as well as base metal dimensions, may play a part in the successful application of wrinkle finish enamels. Further, it was emphasized that the production man concerned with wrinkle finishes should realize that for uniform results careful control must be exercised over such phases of the production process as viscosity measurements, application techniques, and drying and baking times, which may vary under normal operating conditions.

Increased interest is being evidenced in the mechanism of film formation in organic coatings. In this connection, one of the important points brought out by Dr. E. E. McSweeney, supervisor of much of the work being carried out on organic coatings at Battelle Memorial Institute, in the April 1948 issue of "Plating," official publication of the American Electroplaters' Society, is that almost without exception baking of coatings for metal products produces films with better hardness, flexibility, chemical resistance and durability than does air drying; in fact, even lacquers which undergo no chemical change on heating form more dense, adherent films when baked. There are four general methods of film formation in organic finishing: (1) solidification; (2) solvent

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evaporation; (3) oxidation; and (4) polymerization.

Baking

In connection with maintenance of baking equipment for organic finishing, I. J. Barber, Fostoria Pressed Steel Corporation, brought out the fact that an infra-red oven, with the proper reflectivity, may be as much as 500 per cent more efficient than a non-reflective oven ("Factory Management and Maintenance," Feb. 1948). This emphasizes one important point in maintenance of equipment which was brought out in 1948; that is, reflectors for infra-red ovens must be suitable and they must be kept clean. As would be expected, cleaning methods to use, like baking cycles, vary with the problem. In many cases it is possible to blow off with an air blast any loose dirt that has accumulated. If overspray has accumulated it is best removed with a solvent. It is best to remove such coatings by dissolving rather than by hard rubbing with some polishing material. A gold surface appears to be the best all-round reflector surface.

YOUR SIGNAL!

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Clear Metal Lacquer

... FOR ...

SILVER, CADMIUM, ZINC, COPPER, BRASS, ALUMINUM

Outstanding

1. **Adhesion to metal surfaces**
2. **Resistance to sulfur tarnish**
3. **Resistance to oxidation**
4. **Resistance to perspiration**
5. **Resistance to abrasion**

Pale in color. Takes 100-200% reduction. Dries under 15 minutes.

A premium product—priced at ordinary lacquer levels.

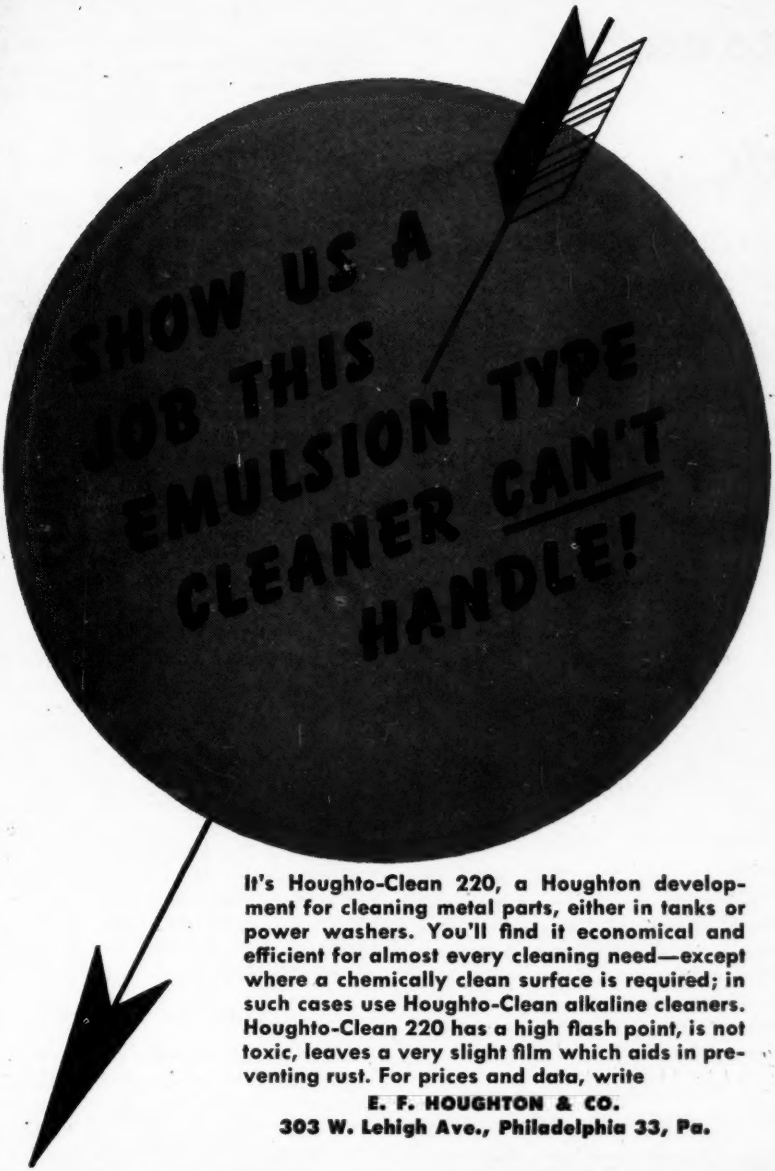
The Varnish Products Company

5208 Harvard Avenue Cleveland, Ohio

Testing and Control

Consistent with the development of improved finishing materials several new testing techniques for organic finishes were described during the past year. A new instrument for measurement of wet film thickness was developed by the Interchemical Finishes Division, and is being offered to the trade as the Interchemical Wet Film Thickness Gage, by Henry A. Gardner Laboratory, Inc., Bethesda, Md. ("Interchemical Review," Vol. 6, No. 4). The instrument can be described as consisting of two concentric wheels, supporting between them a slightly smaller eccentrically mounted wheel that clears a rigid surface upon which the gage is placed by a distance varying from zero to four mils. In use, the gage is held between thumb and forefinger and is rolled over the coated surface, starting at the point where the center wheel clearance is greatest and ending after one-half revolution. At some point along its circumference this center wheel makes contact with the coating. The film thickness is read off directly at this point from the calibration along the edge of the wheel. There is little doubt that this new technique will prove to be a useful tool for maintaining standards of application of coatings.

Further advances in test methods for organic coatings in 1948 brought forth the description by Henry Green and T. P. Lamattina, Interchemical Corporation, of a new method of adherence measurement based on a modified scratch test ("Analytical Chemistry," June 1948). The method appears useful for both laboratory and plant work, and differs from the ordinary scratch test in that the scratch is



It's Houghto-Clean 220, a Houghton development for cleaning metal parts, either in tanks or power washers. You'll find it economical and efficient for almost every cleaning need—except where a chemically clean surface is required; in such cases use Houghto-Clean alkaline cleaners. Houghto-Clean 220 has a high flash point, is not toxic, leaves a very slight film which aids in preventing rust. For prices and data, write

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303 W. Lehigh Ave., Philadelphia 33, Pa.

HOUGHTO-CLEAN 220

LARGE
OR
SMALL
Young & Bertke
OFFERS YOU THE BEST IN OVEN DESIGN

To the left is a large conveyor type oven for baking finish on auto bodies.

To the right is a small multi-purpose oven for a variety of finish baking needs.

Young & Bertke engineers are prepared to build you ovens of any size any capacity to best fit the individual needs of your plant layout and product. Years of experience in successfully solving all kinds of finishing problems are your best guarantee that a Young & Bertke Oven will give you low-cost, efficient service.

Write us today about your finishing needs.

The YOUNG BERTKE Co.
FAN AND BLOWER SYSTEMS
1126 HULBERT AVE. - - CINCINNATI 14 OHIO

made with a knife edge 4 mm. wide, the result being a band, and not a narrow grove, as would be made with a needle point.

Plating on Magnesium

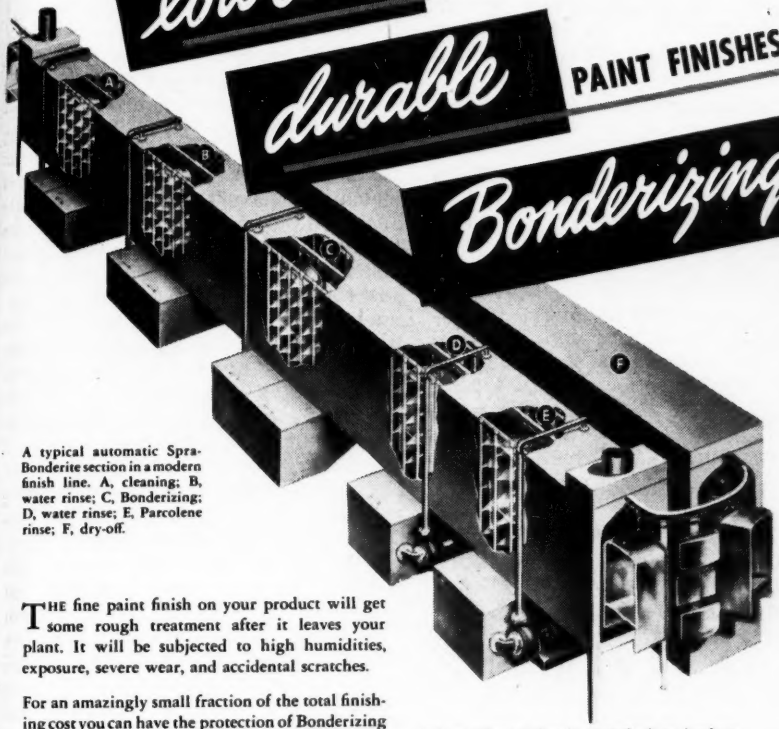
One of the highspots in the development of finishes for the light metals to come out of 1948 was the announcement of a practical method for plating on magnesium which was developed in the laboratories of the Dow Chemical Company. The results of large-scale semi-plant runs using two production shifts a day in plating on magnesium were described by William Loose at the annual 1948 meeting of the Magnesium Association. The basis of the new plating method for magnesium was discussed by H. K. De Long of Dow, who was directly involved in the development, in a talk before the Midland Section of the Electrochemical Society in the spring of the past year.

The new process for electroplating of magnesium consists of three principal operations: (1) surface preparation of the work which usually involves a combination of mechanical and chemical cleaning; (2) application of an immersion zinc coating on the magnesium base; and (3) application of a copper strike, followed by plating in any of the standard plating baths. Other metals such as cadmium, zinc and brass have been applied directly over the immersion zinc coating. In general, the new process closely follows established plating procedures.

Plating on Aluminum

Further advances were made in production procedures for plating on aluminum, with emphasis being placed on the use of proper methods for pretreatment of the alloy prior to plating. A very important step in the zincate immersion process is the treatment of the aluminum alloy surface before immersion in the zincate bath, to ensure

low cost ASSURANCE OF *durable* PAINT FINISHES— *Bonderizing*



A typical automatic Spra-Bonderite section in a modern finish line. A, cleaning; B, water rinse; C, Bonderizing; D, water rinse; E, Parcolene rinse; F, dry-off.

THE fine paint finish on your product will get some rough treatment after it leaves your plant. It will be subjected to high humidities, exposure, severe wear, and accidental scratches.

For an amazingly small fraction of the total finishing cost you can have the protection of Bonderizing—assurance of a durable paint finish.

Bonderizing—quick, simple, and easy to control and apply—does these things to protect and preserve fine paint finishes.

It provides a secure anchor to hold paint. No chipping or peeling.

It retards corrosion effectively.

It checks the spread of rust at the site of the injury when paint is scratched or broken.

It your product has a paint finish, protect it and your customer's satisfaction by Bonderizing before you paint.

Full information is yours on request. A letter will bring you details on Bonderizing and what it can do for your prospect.

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

Parker

PARKER RUST PROOF COMPANY
2172 East Milwaukee Ave.
Detroit 11, Michigan

BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces

the deposition of a uniform film of zinc. Also, the use of a proper acid etch after the usual cleaning procedures has received emphasis. Nitric-hydrofluoric acid etches should be used in surface preparation of all alloys containing silicon, with or without copper.

Finishing Stainless Steel

One of the points brought out in connection with discussions during the year just past on finishing of stainless steel is the importance of passivation. K. G. Huston, in speaking before the 1948 annual regional meeting of the Buffalo, Rochester and Syracuse Branches of the American Electroplaters' Society brought out the point that passivation should be considered in conjunction with each final finishing operation for stainless steel, whether it be scale removal, tumbling, polishing, pickling, grinding, sandblasting or any method which tends to remove the passive film.

Solutions recommended by Huston for passivation of stainless steels consist of 20 to 40 per cent (by weight) nitric acid at 120 to 140 deg. F. for 15 to 30 minutes and an 18 to 22 per cent (by weight) solution of nitric acid to which has been added 1½ to 2½ per cent sodium bichromate, used at 110 to 120 deg. F. for 15 to 30 minutes. The addition of bichromate prevents flash attack on the surface, which will have a dull gray appearance. The first solution was recommended for the ferritic or non-hardenable straight chromium grades and the austenitic or non-hardenable chromium-nickel grades. The latter solution is preferred for the martensitic or the hardenable straight chromium grades and for highly polished parts. Following passivation, the parts should be rinsed thoroughly with cold water.

Further indications of interest in the general subject of passivity were evidenced by the presentation of two papers, as a part of a corrosion symposium at the spring meeting of the Electrochemical Society in Columbus, having to do with passive films on stainless type metals and alloys, and the mechanism of passivity. E. M. Mahla and N. A. Nielsen, reporting on work carried out in the Engineering Research Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, offered additional evidence that the passivity of stainless steel results from surface oxide film formation. By the use of a bromine-methanol solution the experimenters were able to isolate passive films from the surfaces of metals. Some observations on the role oxide films play in passivity of chromium were brought out in the aforementioned symposium by Hackerman and Marshal of the University of Texas.

DEATH
IS SO PERMANENT

Slippery walkways throughout a plant or office occasions many a bad spill. For mopping of most all floor surfaces providing cleanliness without "film," we recommend Tergene. A sample or further information sent upon request.

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To cut hand buffing costs on Plumbers' Brass Goods

Solution

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BUFFS

Result

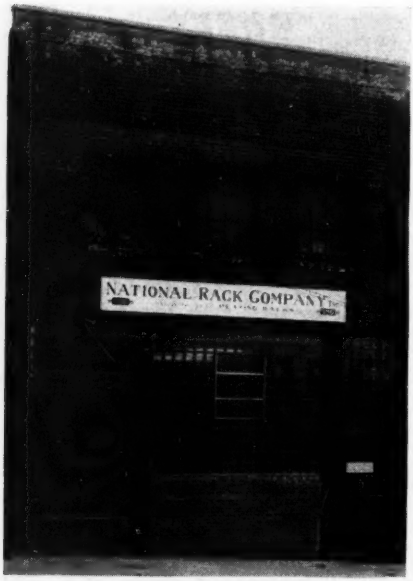
Costs cut 30% by using 86/93 material especially treated for long, hard wear!

WILLIAMSVILLE BUFF DIVISION
The Bullard Clark Company
DANIELSON, CONNECTICUT

NEWS of the Industry

NEW PLANTS

THE NATIONAL RACK CO., INC., 396 River St., Paterson, N. J., is now located in a new plant where additional floor space and up-to-the-minute manufacturing equipment will enable the company to process customers' orders promptly. The National Rack Company specializes in the design and manufacture of specification plating racks. A cordial invitation is extended to customers and friends of the company to visit the new plant.



Plant of the National Rack Company, Inc.

THE COLUMBUS METAL PRODUCTS COMPANY has moved its offices and manufacturing facilities to a new plant located at 1341 Norton Avenue, Columbus, Ohio. An attractive vitrified brick one-story building, marked by the liberal use of large steel frame windows, encloses an air-conditoned manufacturing area measuring 120 x 400 feet. The company manufactures truck and bus lamps, oil burner pots, and other metal products, and maintains facilities for fabrication, electroplating, and painting. William J. Neill, plant manager, is second vice president of the American Electroplaters' Society.

Construction has begun on a plant addition to **THE CELLULO CO.,** Sandusky, Ohio, manufacturer of filtering paper, materials, and devices. The new one-story building will be 50x100 feet and will be made of Natco tile with steel trusses and sash.

COMPANIES

Charles A. Barnett, president of The Foundry Equipment Co., 1831 Columbus Rd., Cleveland, Ohio, has announced the purchase of the industrial oven business of **YOUNG BROTHERS COMPANY** of Detroit. The Young Brothers Company was organized in 1896 and has been one of the nation's leading manufacturers of industrial ovens for paint and varnish baking, lithographing, metal decorating, and other processing. The Foundry Equipment Company likewise is one of the oldest firms in the industrial oven field and has for many years specialized in the design and manufacture of ovens for foundry service, particularly for core baking, mold drying, and heat treating.

Start Clean—

Stay Clean!

Use DARCO Regularly to Keep Your Plating Bath Clean!

Don't run the risk of wasting the time, labor, and expense involved in extensive cleaning by putting the work into a dirty plating bath! *Start* clean . . . *stay* clean! Use DARCO S-51 to keep your plating bath free of the impurities that cause trouble.

Darco S-51 adsorbs to *its* surfaces the impurities that otherwise would be deposited on your work . . . impurities that slip past the mechanical filter. It helps you improve your work in bright nickel, copper, iron, zinc, cadmium, tin, gold, and silver—*at lower cost!*

Is your plating bath as clean as the water in your final rinse?

Darco S-51 is especially treated for use in plating—*it's the only carbon that will meet the benzol-mercury test!* Darco S-51 is especially easy to handle! It's easy to wet . . . easy to incorporate into the slurry. Darco technicians are ready to show you how to make the most of Darco's advantages . . . and Darco distributors are everywhere — write yours for a sample of Darco S-51 *today.*

DARCO CORPORATION

60 East 42nd Street, New York 17, N. Y.

Buckeye Products Company Plant

The Foundry Equipment Company will operate the Young Brothers Company under that name, and will continue the sale, manufacture, and installation of Young Brothers ovens.

It has been announced by Charles Wise, secretary, that **THE BUCKEYE PRODUCTS CO.**, Cincinnati, Ohio, manufacturer of Speedie Buffing and Polishing Compositions and supplier of various polishing room accessories, will observe its 40th anniversary this year.

During that period the company has had three locations in Cincinnati, now being situated in its own modern building which was erected some years ago. In order to take care of increased manufacturing demands prompted by additional business, a plant expansion program was instituted in 1947, being completed last year. The installation of a modern laboratory for development purposes and production control, increased manufacturing facilities, and new and enlarged offices have been completed recently.

Leonard T. Beale, president of **PENNSYLVANIA SALT MANUFACTURING COMPANY**, Philadelphia 7, Pa., has announced the organization of Pennsalt International Corporation, a subsidiary which will handle the varied foreign interests of the parent company. Richard L. Davies is president of the new firm and John H. S. Barr is vice president. Mr. Davies is assistant to the president of the parent company for which Mr. Barr has been export manager since 1944.

The new company will import and export chemicals and raw materials, and in addition will render service to American and foreign industry in the exchange of technical information relating to chemical processes. It will also handle imports for the parent company.

THE HERCULES POWDER CO., 927 Market St., Wilmington 99, Del., has announced that industrial and creative research during the past year resulted in many new industrial applications for plastics based on cellulose acetate; the commercial development of fast drying, tough, brushing lacquers for household use, and the widespread utilization of a new agricultural insecticide to combat the boll weevil and other crop pests.

Another important field for Hercules products during the past year included the synthetic rubber industry. Two Hercules chemicals, one of which was developed during 1948, were employed in the manufacture of a new type synthetic rubber which is claimed to be superior to any developed previously.

CHROME ELECTRO-FORMING CO., 7515 Lyndon Ave., Detroit 21, Mich., has been organized to perform contract hard chromium plating and has been granted exclusive license to the Morey Process for precision chromium plating.

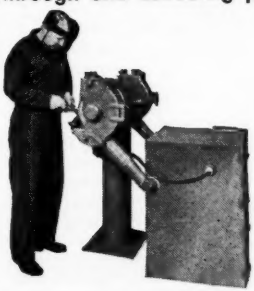
GLOVER COATING CO., INC., 376 Washington St., Malden, Mass., has completed installation of handling machinery for heavy tanks and additional vulcanizing facilities. As a result, the company's potential output of protective coatings on customers' tanks, plating racks, and other equipment has been increased considerably.

The company offers heavy-duty insul-

team up to "skin" the dust problem in this leather working plant

In modern leather working plants skins are shaved and buffed to uniform thickness. It's a dirty, dusty job that liberates large quantities of abraded leather particles. To solve this problem, and eliminate the complicated piping of a central system, one manufacturer called on Torit. The results are pictured above.

In this installation two Torit No. 19-FM Dust Separators are connected, through one collecting pipe, directly to the machine. They run only when the machine is operating and collect the dust so efficiently that a subsequent cleaning operation has been eliminated.



In industry after industry Torit Dust Collectors are solving the dust problem. If you have dust conditions in your plant, get full information and the latest Torit catalog by writing:

TORIT MANUFACTURING CO.

314 Walnut Street St. Paul 2, Minn.

ations of rubber, synthetic rubber, vinyl compounds, baked phenolics, and polyblend paints.

February this year holds particular significance for **OAKITE PRODUCTS, INC.**, 32F Thames St., New York 6, N. Y., pioneer in the field of industrial cleaning materials and methods. It marks the completion of Oakite's fortieth year of cooperation with industry on its production and maintenance cleaning procedures.

John A. Carter, general manager of the company, in commenting on the increasing utilization of its methods and products by industrial plants, states, "The 40 years of achievement we celebrate this month can be attributed in large measure to the company's fundamental policy of rendering a service and selling a product on the side. In the years ahead, Oakite will continue to direct its efforts toward developing this service still further, along with the designing of new materials and improved methods for applying them."

Since its founding in 1909, the company has steadfastly stressed service over and beyond the mere sale of its products. In support of this policy, it maintains a nation-wide field service organization of 180 experienced technical representatives to provide in-plant assistance and to assure the most effective and economical application of its materials by its customers. Striking testimony to the effectiveness of this basic principle is indicated by the fact that, today, the company supplies more than 80 specialized compounds for cleaning and related operations in the metal field and in many other branches of industry.

The Brite Deburring Co., 2612 S. 13th St., St. Louis, Mo., has recently been appointed authorized distributor in that area for the complete line of Almco Supersheen precision deburring and finishing barrels, Supersheen auxiliary handling equipment, and Supersheen materials and compounds. R. C. Trow, manager, **ALMCO SUPERSHEEN DIVISION, QUEEN STOVE WORKS, INC.**, Albert Lea, Minn., in announcing this appointment, also stated that the Supersheen Engineering Clinic for the St. Louis area will be under the supervision of Richard K. Conradi, president and general manager of Brite Deburring Company. This clinic will be a complete installation to duplicate shop conditions and will be available for processing sample lots of metal parts without cost to manufacturers.

CUT COSTS FOR 1949

USE HARRISON'S

4A

COMPOUNDS

YOU FURNISH THE PROBLEM...
WE WILL FURNISH THE ANSWER

Manufacturers of complete line of Polishing and Buffing Compounds in Spray, Dip, and Cake form.

HARRISON & COMPANY, INC.
HAVERHILL, MASSACHUSETTS

NEW POSITIONS

E. S. Phillips, president of Devoe & Raynolds Co., Inc., 44th St. and First Ave., New York 17, N. Y., has announced the appointment of **ROSCOE HALL SAWYER** as assistant chemical director, with headquarters in Louisville.

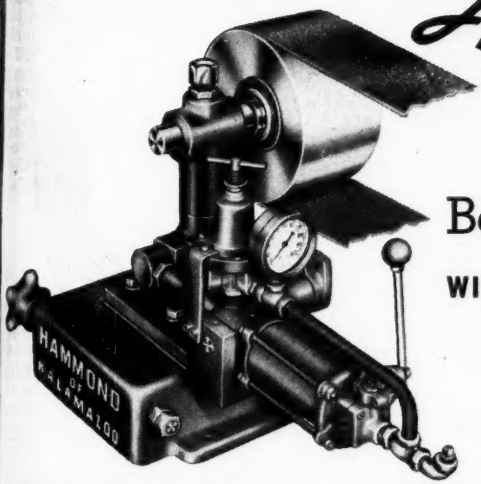
Mr. Sawyer, a graduate of Harvard Engineering School and Graduate School of Arts and Sciences, comes to Devoe with a wealth of experience in paint physics.

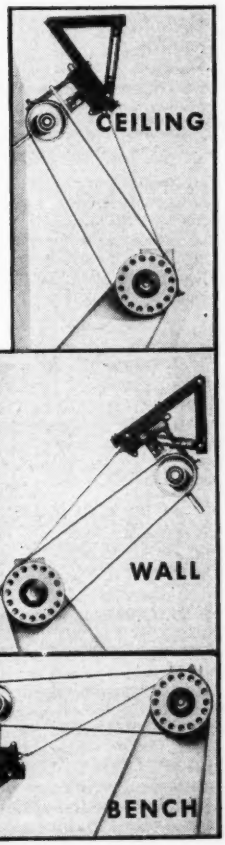
Mr. Sawyer was associated with Du Pont for 18 years specializing in pigment physics. For the last four years he was research supervisor, New Product Development, at Newport, Delaware.

A prolific writer and recognized authority, Mr. Sawyer has contributed articles to many publications, including "Industrial & Engineering Chemistry" and "Journal of Applied Physics."

Hammond of KALAMAZOO AIR Bench Backstand

WITH AIR BELT TENSIONING



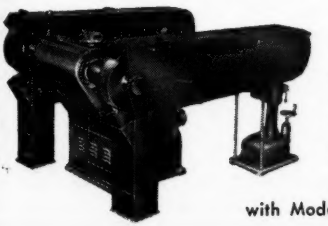


The Model 6-A AIR Backstand SAVES ABRASIVE BELTS — INCREASES PRODUCTION — CONSERVES FLOOR SPACE.

An abrasive belt stretches as used. If correct tension is constantly maintained the belt will last longer and maximum production obtained.

The Model 6-A Air Cylinder tensioning backstand maintains the correct tension throughout the abrasive belt life and automatically adjusts belt stretch to a fraction of an inch.

Write for catalog showing the Model 6-A and our complete line of 9 bench and floor-type backstands.



Another popular installation—Model VRO Variable speed (1500-3000 RPM) polishing lathe with Model 3-R Backstand.

Hammond Machinery Builders INC

1622 DOUGLAS AVE. • KALAMAZOO, MICHIGAN

W. H. Mikesell

United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y., has announced the recent appointment of **W. H. MIKESELL** as sales and service representative in the Chicago area for Unichrome lacquers and synthetics and Ucilon protective coatings.

Mr. Mikesell is a graduate of the University of Illinois with a B.S. degree in chemical engineering. During the war he served for three years in the U. S. Army Corps of Engineers. Before receiving the sales appointment, he received training in formulating, testing, and applying all types of organic coatings at the Carteret laboratories of United Chromium.

Appointment of **R. H. OAKLEY** to the position of assistant general credit manager of The Glidden Co., Cleveland, Ohio, has been announced by J. A. Peters, treasurer. In his new capacity, Mr. Oakley will assist H. W. Caton, general credit manager.

HAROLD R. TANNEY has been elected assistant treasurer of The Monroe Sander Corp., Long Island City, N. Y., manufacturer of industrial finishes, it has been announced by Eugene G. Bloch, executive vice president. Mr. Tanney is a technical sales representative in the New York area.

WILLIAM A. MUNKACSY, former chief chemist of the research laboratories, plastics and synthetic division of the United States Stoneware Company, now president and technical director of The Poly-Cyclo Products Co., Cleveland, Ohio, announces the appointment of **RAY W. GRACE** as vice president and **ERNEST A. MUNKACSY** as secretary.

Mr. Grace was sales manager of the United States Stoneware Company's plastic and synthetic division previous to his appointment as vice president of The Poly-Cyclo Products Company in charge of technical sales through the company's industrial affiliate, Munray Products, Inc. Secretary Ernest A. Munkacsy will assume the duties of plant production control manager of The Poly-Cyclo Products Company.

The firm manufactures protective items such as corrosion resistant plastic and synthetic paints, electroplating rack coatings, tank linings, plastic extrusions and sheeting, together with various correlated rubber products.

J. F. Roche, president of the Binks Manufacturing Company, Chicago 12, Ill., has announced the election of **JOSEPH D. LINEHAN** to fill a vacancy on the board of directors of the corporation.

Mr. Linehan is president of the Continental Plastic Corp., Chicago, Ill. He is also a vice president of Linehan, Inc., printer and lithographer, and a director of the Liberty Federal Savings and Loan Association of Chicago.

Announcement is made by New Wrinkle, Inc., 1771 Springfield St., Dayton 3, Ohio, and Chadeloid Corporation of the election of **ROBERT F. OHMER** as president of both concerns.

New Wrinkle, Inc., is licensor of more than 200 industrial finish manufacturers under its Wrinkle finish patents; Chadeloid Corporation serves nearly 100 licensee manufacturers of patented wood stain formulations. Both organizations maintain research, application service, and promotional activities on behalf of the respective licensee.

Robert F. Ohmer

Ohmer was formerly president of New Wrinkle, Inc., from its inception until the middle of 1942, at which time he left for duty with the U. S. Army Air Force. Since the war he has been vice president in charge of administration of The Hydraulic Press Manufacturing Co., Mt. Gilead, Ohio.

Protecting bearing surface on airplane engine impeller shaft with "SCOTCH" Tape No. 470 before replating.

New, Flexible Plastic Tape
SPEEDS PLATING PREPARATION, CUTS COST

Here's a tough, pressure-sensitive tape that has no equal for quick, economical protection of pieces being electroplated or chemically cleaned.

Extra, plus qualities also fit plastic film "SCOTCH" Tape No. 470 for many other jobs . . . such as insulating exposed pipes or fittings against corrosive fumes and vapors or providing impervious, moisture-vaporproof seals for cans or containers. • Use it where you need a tape that . . .

1. Is unaffected by severe action of acids, alkaline solutions, saline solutions, alcohols, or hydrocarbons.
2. Holds tight on contact—sticks until the job is done—does not call for special application or removal equipment.
3. Conforms snugly and smoothly to oddly-shaped pieces and irregular surfaces.
4. Gives strength plus stretch (average of 200% stretch at breaking point).
5. Comes off easily and cleanly—no after cleanup work required.

Sound like "SCOTCH" Tape No. 470 can help you? Just drop us a line telling us about the job you want it to do. We'll send you a sample to try along with our suggestions for its use. There's no obligation, of course. Write: Minnesota Mining and Manufacturing Company, Dept. PF1 St. Paul 6, Minnesota.

REG. U.S. PAT. OFF.

SCOTCH
BRAND
Tape No. 470
for ELECTROPLATING

ANOTHER 3M PRODUCT

Made in U. S. A. by **MINNESOTA MINING & MFG. CO.** St. Paul 6, Minn.
General Export: DUREX ABRASIVES CORP., New Rochelle, N. Y. In Canada: CANADIAN DUREX ABRASIVES LTD., Brantford, Ontario

Mr. Ohmer will establish the main offices of New Wrinkle, Inc. (heretofore maintained in Dayton, Ohio) in Chicago, but the laboratories remain in Dayton.

Appointment of **JOSEPH A. NEUBAUER** as technical director for the Columbia Chemical Division of the Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22, Pa., and for the Southern Alkali Corporation has been announced by E. T. Asplundh, vice president. Mr. Neubauer has served as technical advisor to the Columbia Chemical Division since 1945.

Several new appointments in the Chemicals Division of the General Electric Company's Chemical Department have been announced. They include the following Pittsfield men: **H. ARTHUR HOWE,** manager of the Pittsfield, Massachusetts phenolic products plant and the Coshocton, Ohio varnish plant; **WYMAN GOSS,** section engineer in charge of engineering on phenolic resins and compounds; and **J. RAE STIRRAT,** sales manager of phenolic products.

SAVE MAN HOURS
MURCO TUMBLING BARRELS
IN DEBURRING AND POLISHING AND IMPROVING THE QUALITY OF YOUR FINISHED PRODUCTS
* COMPACT
* SAVES TIME
* VARIABLE SPEED
* STOP BARREL ANY POSITION
SPEED CHANGES WHILE BARREL IS IN MOTION!
MURCO Tumbling Barrels are preferred today by plants that deburr, burnish, clean, polish, and smooth-surface metal and plastic parts on a mass-production basis. With its variable speeds, you have a wide range to meet various operating conditions and requirements... there are infinite speeds between 10 and 25 r.p.m. and, the special brake mechanism stops the barrel in any position, as well as facilitate loading and unloading . . . prevents accidental dumping of loads.
Write! for complete details and prices.
D. J. MURRAY MANUFACTURING CO.
WAUSAU • WISCONSIN

W. C. McCaslin, general manager of Sewall Paint & Varnish Company and vice president of American - Marietta Company, the parent organization, has announced the appointment of **FRED CUMMINS** as manager of trade sales and factory branch offices, with headquarters in Kansas City.

Mr. Cummins has been with the company for 16 years.

Fred Cummins

E. H. Bucy, general manager of the industrial finishes department, Atlas Powder Co., Wilmington 99, Del., has announced several recent changes involving the sales force operating near the Stamford, Connecticut plant.

KENNARD M. ANDERSEN, one of the company's representatives in the Metropolitan New York area for the past year, has taken over the territory covering western New York State.

ROBERT A. STEVENS, a member of the sales force for the past three years, has moved into the territory covering the central and northeastern sections of New York State. **JOHN S. BRUNDAGE** is now representing Atlas industrial finishes department in eastern Connecticut.

JAMES W. POLLARD, JR., has been named assistant superintendent of The Glidden Company's Lithopone Division in Baltimore, it was announced by J. P. Ruth, vice president of The Glidden Company in charge of the Chemical and Pigment Division. In his capacity, Mr. Pollard will assist I. J. Foote, superintendent of the Lithophone Division.

Appointment of **BROOKS M. DYER** as St. Louis district sales manager for the Columbia Chemical Division of Pittsburgh Plate Glass Company has been announced by W. I. Galliher, executive sales manager for the division. His headquarters will be at 3650 Market Street.

• FOR HIGH PRODUCTION POLISHING AND BUFFING •

ROTARY AUTOMATICS • SEMI-AUTOMATICS • STRAIGHT LINE AUTOMATICS

ACME STRAIGHTLINE AUTOMATICS

• Cut POLISHING and BUFFING COSTS!

ACME— Horizontal Return Type, 20 to 120 ft. long.

ACME— 32 ft. Six Head Unit— loading table at one end — unload at opposite end—loose fixtures return by gravity roller or power belt as shown.

ACME Automatic Straightlines have proved effective in securing increased production at lower unit costs in a great many plants. They step up output per man-hour and maintain uniform standards of finish. Arrangements of tables, wheels and fixtures are planned to meet the requirements of the specific job.

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

1645 HOWARD ST. DETROIT 16, MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

Associated with the Columbia Chemical Division since 1943, Mr. Dyer served as an assistant sales manager at Philadelphia until his transfer to St. Louis in January 1948. As district sales manager, he succeeds Vernon L. Clark who has been assigned to special sales duties.

Link-Belt Co., Chicago 8, Ill., has announced that **R. E. WHINREY,** formerly superintendent, has been appointed to the

R. E. Whinrey (left), L. C. Heinlein

newly created position of assistant general manager of the Link-Belt Dodge plant in Indianapolis, and that **L. C. HEINLEIN,** formerly assistant superintendent, has been appointed superintendent of this plant. The Dodge plant is devoted to the manufacture of Link-Belt ball and roller bearings of both mounted and unmounted types.

SOCIETIES

The **AMERICAN ELECTROPLATERS' SOCIETY** recently inaugurated Research Project Number 11 on "Current and Metal Distribution in Electroplating" at Evansville College, Evansville, Indiana. The director of the project will be Dr. John Kronsbein, who is head of the department of engineering.

The experimental work will include the electrodeposition of various common metals on a variety of standard geometric shapes of the types usually encountered in the metal forming and die casting industries, under varying current densities and bath compositions. These deposits will then be accurately measured for metal thickness. It is hoped that the data collected in this manner will enable electroplaters to more accurately choose suitable electroplating conditions to obtain satisfactory metal distribution on complex geometric shapes.

Dr. John Kronsbein is well qualified to conduct research in this field since he has previously published a number of excellent theoretical investigations on this subject in the "Journal of the Electrodepositors Technical Society" and the "Proceedings of the London Mathematical Society." The measurements which will be carried out under this project will reveal how much theoretical current distribution deviates from that encountered in actual practice.

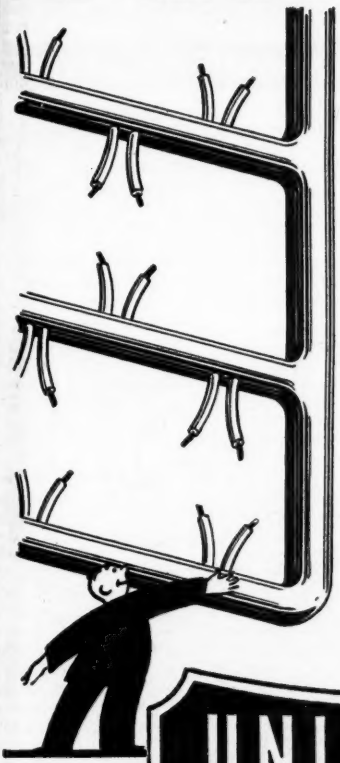
The Project Committee is composed of Dr. R. A. Schafer, Cleveland Graphite Bronze Co., Cleveland, Ohio, chairman; Dr. Harold Weisner, Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.; and Leonard Weeg, National Lock Co., Rockford, Illinois.

The newly inaugurated pre-shipment testing of porcelain enamel packaged products, sponsored by the **PORCELAIN ENAMEL INSTITUTE,** received the enthusiastic acclaim of more than 20 freight claim and damage prevention officers of U. S. and Canadian railroads at a recent meeting in Buffalo.

Designed to closely simulate actual handling and transportation shocks which the packaged product is likely to encounter, the recommended pre-shipment testing equipment consists principally of: an impact tester which determines the ability of the container, interior packaging, and the product itself to withstand shocks and impacts experienced in actual shipment, and a vertical shock tester which determines the ability of the container, interior packaging, and the product to withstand vibrational shocks encountered during various means of transportation. The conditions simulated include resonance, flat car wheels, rail joints, rough road bed, and car side sway.

Sixteen members of the **RADIANT HEATING COMMITTEE** of the **AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS** were the guests of the

TWICE THE WEAR AT HALF THE COST!



Unichrome Coating 218 cuts expenses for one of the country's largest platers!

With their tremendous plating operation, this company has really been able to put Coating 218 through its paces, under every plating room service. They discovered that Unichrome Coating 218 gives better than twice the service life of former coatings, costs less than half per rack...and reduces rack maintenance by 50%!

It will pay you to investigate the substantial savings possible with this flexible, baking synthetic. It resists all plating solutions, contains 100% solids (all *working* material—nothing lost to thin air). It forms a glossy, heavy coating that cuts dragout, resists damage. Why not write for our bulletin RC-1 for more details?

If you have no baking facilities, there are local applicators who will cover your racks with Coating 218.

UNICHROME

Trade Mark Reg. U.S. Pat. Off.

RACK COATINGS—Products of

UNITED CHROMIUM, INCORPORATED • 51 E. 42nd St., New York 17, N.Y.

Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio • Los Angeles 13, Cal.

Ford Motor Company recently at its Lincoln-Mercury Division plant at St. Louis, Missouri. The committee commended the Ford Motor Company on its pioneering and development of electric infra-red heating. The meeting and plant visitation were intended to celebrate the tenth anniversary of this type of heating first installed at the company's River Rouge plant by F. J. Groven.

The Institute committee, which is sponsoring further development of electric heating, is made up of representatives from equipment manufacturers, electric utility companies, instrument manufacturers, engineering professors from several leading universities, lamp manufacturers, advisors from the paint and textile industries, and leading industrial users of electrical radiant heating.

The committee was appointed by Everett S. Lee, president of the American Institute of Electrical Engineers, and its activities are directed by Paul H. Goodell of the Trumbull Electric Manufacturing Company as chairman, and Charles E. Russell of the Philadelphia Electric Company, secretary.

The committee inspected eight of the new type ovens which combine controlled convection with infra-red heating for curing synthetic enamel finishes. The eight ovens handle a heating load of approximately 60 tons per hour, with a maximum demand of 3,000 kilowatts. This represents a production of 40 cars per hour with two coats of finish baked with the electric heating at 325 deg. F. The power demands of the new ovens have been reduced over 40 per cent with the result that a single coat of enamel is baked on a sedan body with energy consumption of only 16 kilowatt hours. The ovens are used for baking the finish on bodies, fenders, hoods, wheels, and other sheet metal parts. They range in size from 100 to 700 kilowatts each, and in length from 25 to 170 feet.

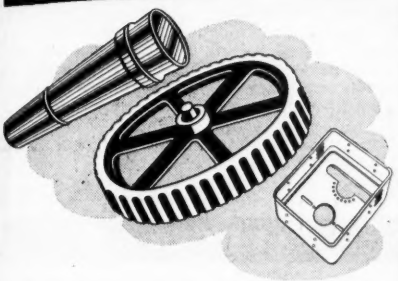
TRAINING COURSES

A course on color and gloss measurement is being proposed by **HENRY A. GARDNER LABORATORY, INC.**, Bethesda 14, Md. If there is sufficient interest in this project, it will be held at the Laboratory under the direction of R. S. Hunter, chief optical engineer.

The proposed course will consist of two one-hour lectures and two two-hour laboratory periods each day. The lecture

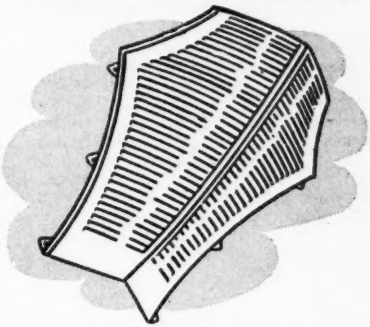
(Front row, left to right) Wm. H. Wagner, L. E. Cole, E. J. Bates, L. E. Stout, J. E. Johanson, Earl Benson, V. G. Richardson, Ford Motor Company. (Second row, left to right) P. O. Blackmore, W. H. Wannamaker, Paul H. Goodell, committee chairman, Chas. E. Russell, committee secretary, O. C. Wallace, Chas. A. Casey. (Back row, left to right) I. J. Barber, C. Heaton, E. A. Linsday, J. E. Sump, R. J. Might, W. F. Hickes, C. T. Prendergast

Vapor Degreasing thoroughly removes grease and oil



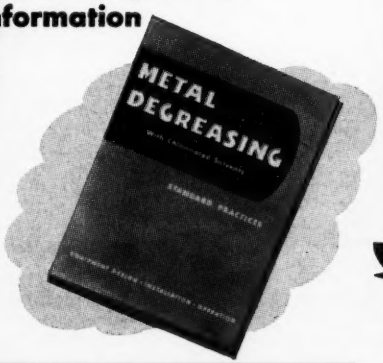
IN ONE OPERATION, often in less than one minute, this economical cleaning method removes all traces of grease and oil from metal parts of any size or shape—plastics, glass and many other materials. It can save time and cut costs in large and small plants because it speeds production and cleaning.

reaches almost inaccessible places . . . reduces risk of damage



VAPOR DEGREASING reaches deep draws, holes and almost inaccessible places. It reduces the risk of damage to small, delicate parts . . . makes possible more accurate inspections during machining operations or assembly. And it renders parts clean, warm and dry—ready for the next operating step.

This book gives full information



"METAL DEGREASING—STANDARD PRACTICES" tells you how to carry out Vapor Degreasing safely and economically. It shows why the results obtained with this method can't be matched. It shows typical compact, scientific equipment, which is available for efficient and economical operation. And it gives information about solvents used in this equipment—Du Pont Trichlorethylene and Perchlorethylene—which under various trade marks have been widely used for many years. Send for it today!

DU PONT non-flammable SOLVENTS for VAPOR DEGREASING

SOLD NATIONALLY THROUGH DISTRIBUTORS

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

CLIP THIS COUPON—MAIL TODAY!

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

Please send me my copy of "Metal Degreasing—Standard Practices."

Name_____

Position_____

Firm_____

Address_____

subjects will cover the fundamentals of appearance, both from the physical and psychological standpoint, and will discuss instrument operation and maintenance. The laboratory periods will be devoted to actual examples of instrument operation and problems of maintenance.

THE COLLEGE OF THE CITY OF NEW YORK, SCHOOL OF TECHNOLOGY, will offer a course in Practical Electroplating, registration beginning February 9, on Monday evenings, 12 weeks, 2 hours per week. The primary objective is to provide commercial electroplaters with a sound understanding of the principles underlying their work. For details address Dr. Bernard Levy, City College, New York 31, New York.

Industrial instrument maintenance and repair courses, conducted for the past 15 years by **BROWN INSTRUMENTS DIVISION** of **MINNEAPOLIS-HONEYWELL REGULATOR COMPANY,** Philadelphia 44, Pa., will be divided during the first six months this year into four classes of five weeks each, with longer courses for company personnel.

In announcing the broadening of its instruction for the benefit of industry and for its own personnel, M. J. Ladden, head instructor of the school, made known that the course for company personnel will start February 21. It will be subdivided into specific classes for instruction in millivoltmeters, mechanical pyrometers, continuous balance electronic potentiometers, electrically operated automatic controls, flow meters, thermometers, pressure gages and hygrometers, air-operated controls, Moist - o - Graphs, tachometers, resistance thermometers, CO_2 and analygraph.

The five-weeks' classes will continue through to June 17.

HOLLAND SAYS:
CUT BUFFING COSTS
Steel Base, V Belt Drive Ball Bearing Polishing Machine from 1 to 3 H.P.
Write for FREE folder "M" showing our wide selection of metal finishing equipment.
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N. Y.

MEETINGS

THE 1949 CHICAGO TECHNICAL CONFERENCE AND PRODUCTION SHOW will be held at the Hotel Stevens on March 14, 15, 16, and 17. Since the Conference and Production show are sponsored by the 55 affiliated societies making up the Chicago Technical Societies Council, the theme of the meeting, "What's New," will cover a wide range of subjects such as equipment, methods, materials, shop practice, processing, management, research, plant facilities, and so on.

The 1949 Conference, over the four-day period, will be broken up into 17 big sessions with a maximum of three sessions at any one time. Approximately 50 nationally known speakers will bring their latest thinking and experience to the many subjects to be considered by the conference. Details of the program are being worked out so that the subjects will be of interest to the supervisory personnel of industry as well as to the members of the 55 affiliated societies.

The banquet on Wednesday evening, March 16, will be one of the highlights of the Conference and Show. One of America's outstanding industrialists will be the principal speaker, and an unusually fine entertainment program will run through the dinner and after the main address.

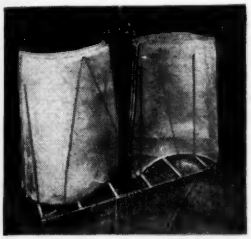
The Production Show will parallel the interests of the Conference and will carry the same general theme. Exhibitors will show the latest in equipment, materials, methods, and services that will help maintain American world-wide industrial supremacy.

complete FOR SERVICE

consult

Cambridge

ON FABRICATED WIRE ASSEMBLIES FOR BULK HANDLING & PROCESSING



Representative baskets, racks and crates produced by Cambridge for bulk handling in a large, modern finishing shop

Cambridge offers the engineering and fabricating facilities to supply you with baskets, trays, racks, crates or specialized fixtures in any metal or alloy... custom-built for your particular requirements. Cambridge wire fabrications are "job-fitted" for all types of bulk handling and processing to insure maximum efficiency.

Call Cambridge for wire fabrications whenever your products need heat treating, pickling, dipping or washing.

For information on the complete Cambridge line, write for your FREE copy of this illustrated booklet. Consult your Cambridge Field Engineer on any individual problem.

There's a Cambridge Sales Engineering Office near you!

Cambridge Wire Cloth Co.

Department A
Cambridge 2, Md.

Wire cloth in rolls. Any metal or alloy, mesh or weave.

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

The Board of Directors of the **NATIONAL ASSOCIATION OF METAL FINISHERS, INC.**, 2236-39 Dime Bldg., Detroit 26, Mich., will hold a meeting on Monday, March 7, 1949, at the Netherland Plaza Hotel, Cincinnati, Ohio.

Members of the association, as well as members of the industry, are cordially invited to attend this meeting.

The 36th Annual Convention of the **AMERICAN ELECTROPLATERS' SOCIETY** will be held at the Hotel Schroeder, Milwaukee, Wisconsin, June 27-30, 1949.

The convention activities are being planned by a committee composed of the following: General Chairman, William C. Geissman; General Co-Chairman, Henry Bornitzke; Educational, Leslie Diveley; Finance, Robert Steurnagel, Jr.; Registration, Frank Marz; Hotel Reservations, Glen Schwemer; Program, Ted Hartshorn; Entertainment, Jack Davis; Hotel, Everett Robinson; Publicity, Vincent Mattacotti; Banquet, Rodney Olsen; Luncheon, Axel Johnson; Outing, R. F. McGuire. The Ladies' Program is being planned by Mrs. R. F. McGuire.

The **DAYTON BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** announces its fourth annual educational session and dinner dance which will be held Saturday, February 12, at the Miami Hotel.

The educational session will begin at 1:30 p.m. and will include the following speakers: George W. Jernstedt, Westinghouse Electric Company, "Periodic Reverse Plating;" Dr. Louis Weisberg, consultant, "Leveling in Nickel Plating;" and Dr. Ralph Schaefer, Cleveland Graphite Bronze Company, "The A.E.S. Research Program."

The **NEW YORK BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** will hold its annual educational meeting and banquet at the Hotel Pennsylvania, New York, on Saturday, February 26.

The educational session will begin at 2 p.m. Speakers and their subjects are as follows: Edward Rinker, Bart-Messing Corporation, "Precious Metal Plating;" Harold Narcus, Electrochemical Industries, "Introduction to Metal Evaporation;" and Kenneth Huston, Armco Research Laboratories, "Electropolishing of Stainless Steel."

A banquet in the evening, followed by a floor show and dancing will conclude the program.

HONORS

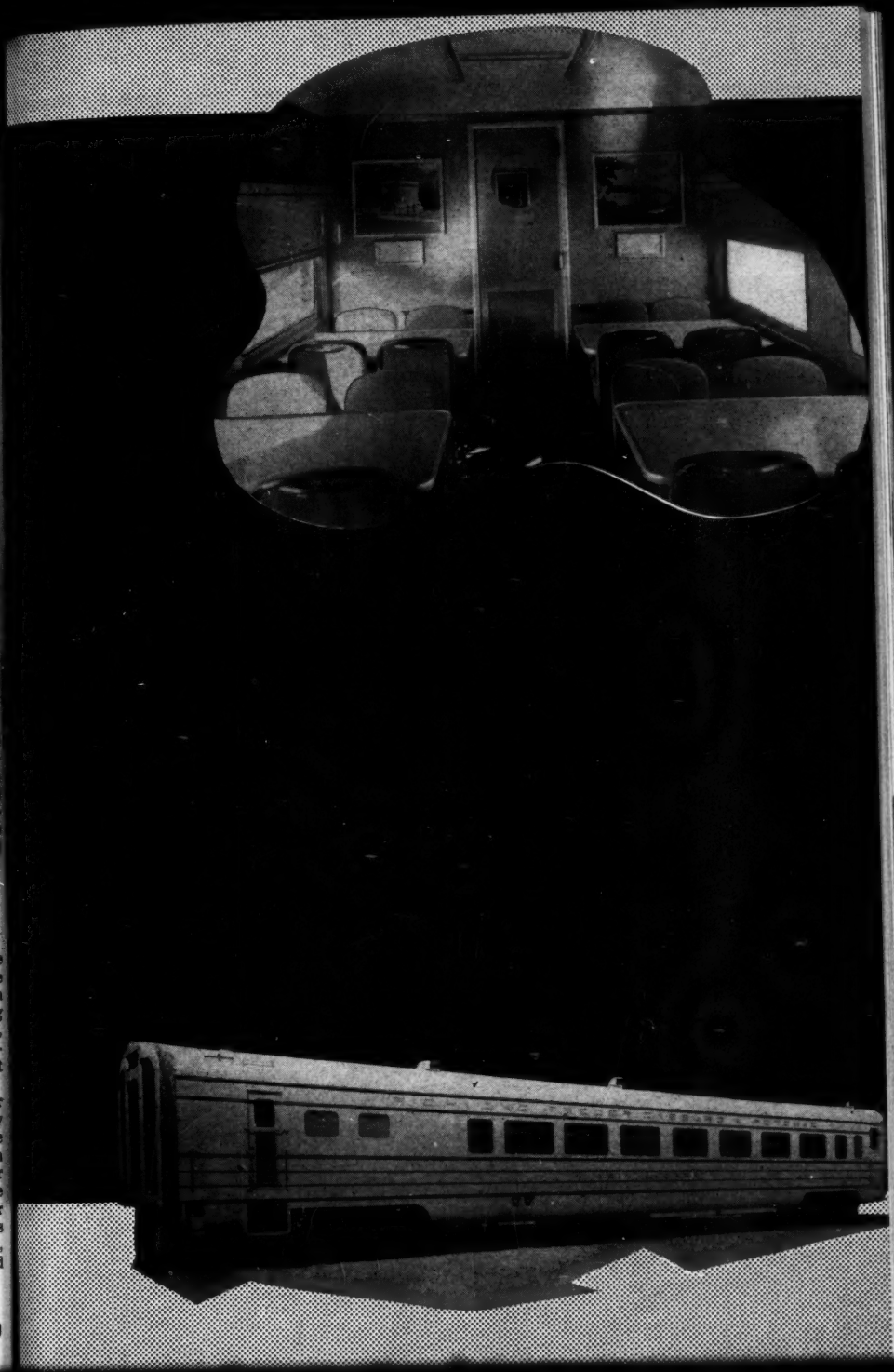
CENTRAL PAINT & VARNISH WORKS, INC., Brooklyn, N. Y., has been awarded a special Certificate of Merit for having completed the six months' period of the Sixth Annual Inter-Plant Accident Reduction Contest, April 1 to September 30, 1948, without a lost-time accident. Awards were presented recently at a dinner in the Grand Ballroom of the Hotel New Yorker by the Greater New York Safety Council, under whose auspices the contest was given.

NECROLOGY

DAVID A. NEMSER, metallurgist and head of the New England Technical Section of the Development and Research Division of The International Nickel Company, Inc., died Wednesday afternoon, January 5, at his home, 20 Staples Place, West Hartford, after an illness of several weeks. He was 51 years old.

ROSS COFFIN PURDY, who more than any other one man was responsible for the vigorous and continuing growth of The American Ceramic Society during the first half-century of its existence, died January 6, 1949, at White Cross Hospital, Columbus, Ohio, following a heart attack. He was 73 years old.

Dr. Purdy retired in March 1946, after serving for 25 years as general secretary of The American Ceramic Society. He had completed a task which began soon after his retirement in 1912 as professor of ceramic engineering at the Ohio State University, when he began to work for the reorganization of the Society into its present form, with industrial divisions, local sections, student branches, and active standing committees.



New • EQUIPMENT • MATERIALS • PROCESSES

Rohco 20 XL

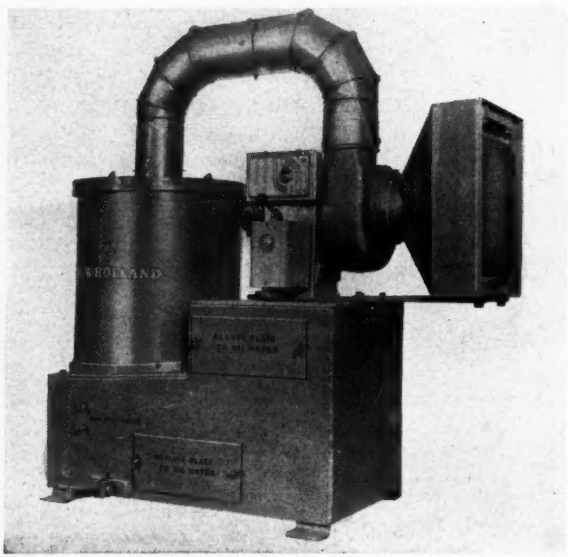
R. O. Hull & Co., Inc., 1279 W. 3rd St., Cleveland 13, Ohio, has announced a new improved brightener for cadmium plating, Rohco 20 XL, which is claimed to make possible unusually brilliant cadmium plate directly from the plating bath without a bright dip. The plating characteristics of cadmium baths containing this product are said to be excellent with respect to wide range of current density, concentration, and throwing power.

New Holland Kreider Centrifugal Dryer

A centrifugal dryer which dries a basketful of small parts in only 35 seconds has been added to the line of the New Holland Machine Co., New Holland, Pa. In addition to the standard model, other models with gas or steam heating units are available.

The New Holland Kreider Centrifugal Dryer is designed for operation by one man in a minimum of floor space. Of steel plate construction, the dryer requires 32 x 18-inch floor space for the standard unit, 44½ x 18½-inch with steam heating unit, and 54 x 22½-inch with gas heating unit. The standard unit measures 27 inches from the floor to the top of the basket cage and 30 inches to the top of the outside cage.

The 12 x 12-inch basket, standard equipment with each dryer, is made of heavy gauge steel woven mesh and steel frame. The basket rotates at 625 r.p.m., driven by a ¾ h.p. motor which is said to provide ample power for efficient, economical operation. The motor is protected against moisture.



New Holland Kreider Centrifugal Dryer with gas heating unit

It can be operated in either direction, a fast-action foot brake stopping the basket almost instantly for reversal.

A V-belt drive serves to eliminate gear noises and a special belt tightener operates constantly while the motor is running. Two large anti-friction ball bearings support the main spindle shaft.

Niagara Aero After Cooler

Product of the Niagara Blower Co., 405 Lexington Ave., New York 17, N. Y., the new model Niagara Aero After Cooler has been designed for simplified construction and for protection from freezing in outdoor installations.

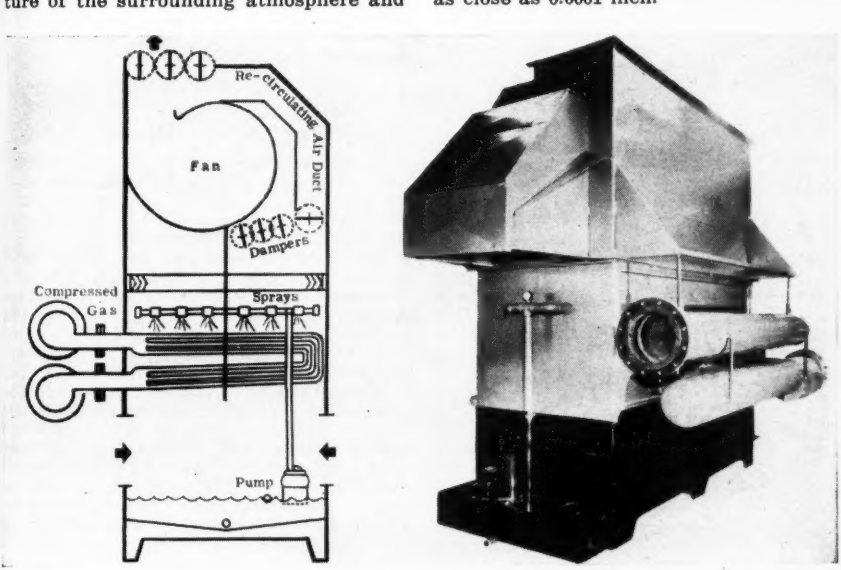
This equipment is designed to dehydrate compressed air or gas by cooling it to a temperature below the dry bulb temperature of the atmospheric air, thereby removing the moisture that condenses and preventing further condensation of water in air or gas lines. This result is said to be attained by the evaporation of a recirculating water spray on the surface of a coil through which the compressed air passes, creating a temperature close to the wet bulb temperature of the surrounding atmosphere and lower than the dry bulb temperature and also below the summer surface water temperature.

In the new model, protection against freezing is afforded by the use of the "Balanced-Wet-Bulb" control. A thermostat in the spray water reservoir is set for a desired low temperature limit at which it operates dampers to recirculate the air stream internally around a division plate in the center of the unit, instead of drawing in freezing air.

The manufacturer points out that prevention of condensation in air lines saves water damage to air tools, paint sprays, or materials in process.

Hydro-Finish Blasting Process

New "Hydro-Finish," a modified form of impact blasting with an abrasive suspended in liquid, is now available from the Pangborn Corp., Hagerstown, Md., blast cleaning equipment manufacturer. This development differs from existing blast cleaning equipment, the manufacturer states, in that extremely fine mesh abrasives can now be used, making possible the blast cleaning of precision machined parts with dimensional tolerances as close as 0.0001 inch.



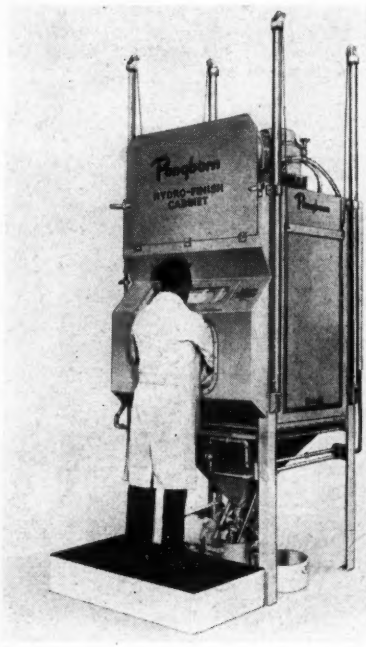
Niagara Aero After Cooler

Hydro-Finish is said to be a simple process easily and economically accomplished in a watertight cabinet provided with a hopper tank for mixing, storing, and recollecting the suspension. A circulating pump delivers the liquid to the blasting nozzle and velocity is imparted at this point by compressed air.

Engineers say there is no limit to the fineness of the abrasive particles. Material as fine as 5000 mesh equivalent is in common use. By varying particle size, particle hardness, air pressure, distance of gun from work, and liquid-abrasive ratio—or any combination of these factors—almost an infinite number of finishes and uses are possible.

Blast cleaning experts claim that Hydro-Finish can be used to great advantage by any industry with problems in deburring, finishing threaded sections, surface finishing, and removal of directional grinding lines, heat treat scale or discolorations; it is said to be ideally suited for use in preparing surfaces for electroplating, painting, or enameling.

Hydro-Finish cabinets are available in four sizes, requiring floor space of 30 x 36, 48 x 36, 60 x 48, and 72 x 60 inches, and ranging from 7 feet 10 inches to 10 feet 9 inches in height.



Cabinet used for Hydro-Finish Blasting Process

Custom-Built Dipping Baskets

The Hanson-Van Winkle-Munning Co., Matawan, N. J., has announced the availability of engineering service for the design and construction of dipping baskets made to the customer's specifications.

To assist the H-VW-M engineers in designing the dipping baskets, the following information should be furnished:

A. Work
   1. Weight per piece
   2. Size and shape
   3. Anticipated hourly production in terms of pieces or plating cylinders of given size

B. Cycle
   1. Sequence of alkalies, acids, and rinses
   2. Concentration of alkalies and acids
   3. Temperature of above
   4. Immersion times in each treatment

If the customer prefers, he need only supply the following information: (1) style, (2) material, (3) dimensions, (4) mesh number, (5) wire size, and (6) quantity desired; and his baskets can be designed and manufactured.

Cycloflex PC-11 Plastic Lining

Developed specifically for the protection of drums and tanks, Cycloflex PC-11, a rugged, chemically inert membrane, has been announced by The Poly-Cyclo Products Co., Cleveland, Ohio.

Cycloflex is said to be sturdy and tough, providing excellent resistance to chemical corrosion. Inorganic acids, alkalies, aliphatic hydrocarbons, water, oil, grease, oxidants, cleaners, and even nitric and chromic acids are readily repelled, it is claimed.

Among the advantages claimed by the manufacturer for Cycloflex PC-11 white plastic lining are that progress of work being processed may be easily observed and that tools, parts, and foreign matter dropped into tanks or drums may be easily detected. This white lining is claimed to be entirely non-contaminating to any plating solution, including rhodium and gold. Drums and tanks lined with Cycloflex white are said to have a smooth high gloss finish which simpli-

HARD and TOUGH

for TUMBLING

SIMONDS ABRASIVE CO.

Borolon Tumbling Abrasive is fused crystalline aluminum oxide, scientifically manufactured in Simonds own electric furnace plant at Arvida, Quebec, Canada. It removes flash and bead from stampings, puts a radius on small parts and gives a precision finish. Furnished graded to one size or run-of-mill sizes such as 6 to 12, 12 to 30, 30 to 60, etc. Also in lumps ¼" to ½", ½" to ¾", ¾" to 1" and 1" to 1½". Write for inspection samples and prices.

SIMONDS ABRASIVE CO., PHILA. 37, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

fies draining and cleaning.

Cycloflex is also available in high gloss black which, like Cycloflex white, is said to withstand great fluctuations in temperature without cracking or chipping and to possess high bond strength, superior density, and freedom from porosity. Cycloflex lining is claimed to withstand mechanical abuse and deterioration over a long period of time.

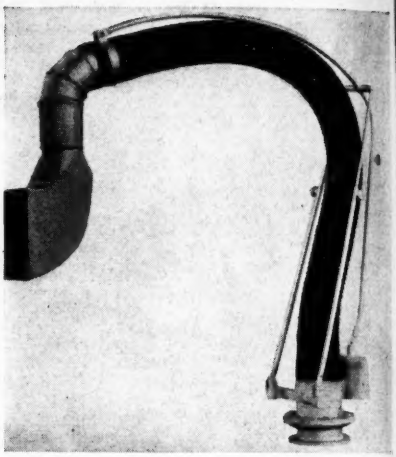
New Hammond Model 3-A Air Backstand

The Hammond Model 3-A Air Backstand, announced by the Hammond Machinery Builders, Inc., Dept. GP-25, Kalamazoo 54F, Mich., was designed for heavy production grinding or polishing with abrasive belts.

The Model 3-A is fitted with an air-actuated cylinder to maintain correct belt tension automatically, compensating immediately for variations in belt length caused by belt stretch. Since the correct belt tension may vary with different setups, the operator, after determining and establishing the correct belt tension, may set the pressure regulator valve to maintain that tension.

The Model 3-A is of heavy cast iron construction except for a stainless steel 12-inch diameter 7-inch face idler pulley. The pulley is diametrically balanced and runs on high quality sealed ball bearings.

New Hammond Model 3-A Air Backstand



New Torit Suction Tube Assembly

New Torit Suction Tube Assembly

Torit Manufacturing Co., 314 Walnut St., St. Paul 2, Minn., has designed a new suction tube assembly for connecting its self-contained dust collector to wheels on surface grinders, tool and cutter grinders, and other machines that cannot be properly hooded.

Made in a 3 x 4-inch size to fit standard inlet holes, the assembly has duck covered hose for greater flexibility. The holding framework closely follows the curve of the tubing, and the former overhang of the counterweight has been largely eliminated. This makes a very compact arrangement and permits placing of the nozzle directly in the dust stream with a minimum of interference to working conditions, it is claimed. The new suction tube assembly can be fitted with either a vertical or angular type nozzle.

SPIN-DRIES SMALL PARTS *IN 2 MINUTES**

STANDARD MODEL KREIDER DRYER . . . Auxiliary gas or steam heating units available.

Pays for itself in time saved . . .

Dries Faster. Takes as *little* as 35 seconds to whirl parts completely dry—no more than 2 minutes for 50 pounds—drying basket (capacity 1140 cu. ins.) spinning at 625 rpm.

Dries Better. There's no marring or scarring with a Kreider Dryer. It produces smooth, evenly dried surfaces with longer lasting lustre.

Dries More Economically. Simple in design . . . rugged in construction, the Kreider Dryer is operated by one man. Uses less than one hp. Occupies less than 6 square feet floor space.

See for Yourself! Write today to Department PF 29 for an illustrated 4-page folder . . . also addresses of installations near you, where you can see a Kreider Dryer in action.

New Holland Machine Co., New Holland, Pa.

***Only 2 simple steps required . . .**

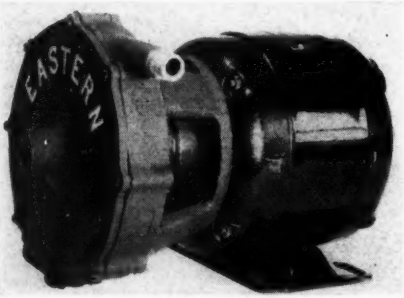
(1) Operator places wire mesh basketful of small parts in Dryer . . . turns motor "ON".

(2) Operator turns motor "OFF" . . . presses foot brake . . . removes basket.

NEW HOLLAND *KREIDER* DRYER

Model H Centrifugal Pump

Eastern Industries, Inc., 296 Elm St., New Haven 6, Conn., has developed a centrifugal pump, designated as Model



Model H Centrifugal Pump

H, designed specially for those applications where moderate pressures and volumes are required from a centrifugal pump running at 1,725 revolutions per minute.

Model H Pump is said to be a highly efficient slow speed centrifugal pump designed for long life, and rugged, trouble-free applications. It is constructed in either bronze or aluminum with lifetime mechanical rotary seal. Units are available with motors ranging from 1/6 to 1/3 h.p., depending on operating range desired. With 1/6 h.p. motor, the overall size is 12⅛ inches long x 7⅜ inches high x 8$\frac{3}{16}$ inches wide, and the weight in bronze construction is 37 pounds.

New Resn-X Flooring

Rock-Tred Corp., 627 W. Washington Blvd., Chicago 6, Ill., manufacturer of industrial flooring and other building maintenance items, has announced new Resn-X Flooring which, it is claimed, will remain unaffected by most acids, alkalis, oil, and other chemicals.

The manufacturer describes Resn-X as a durable but resilient heavy-duty resurfacer that can be easily brushed or troweled over any type of floor, concrete, wood, tile, metal, composition, and so on, to a thickness of $\frac{1}{32}$ to $\frac{1}{16}$ inch, providing a non-slip wear-resisting surface that will resist chemical and solvent attack.

In general, Resn-X is said to have excellent resistance to solvents and chemical corrosives, alcohols, glycols, petroleum solvents, oils, fats, waxes, most acids, alkalis, water, soap solutions, detergents, and salt solutions.

DeVilbiss NCD Compressor

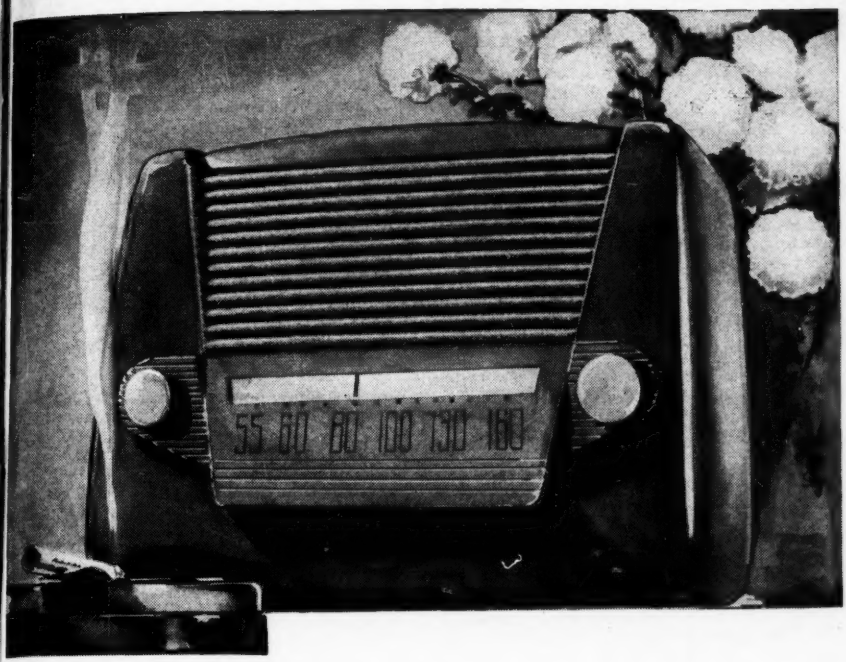
The DeVilbiss Co., Toledo 1, Ohio, has announced a new portable air compressor designed especially for the home workman, small service shop, or as an auxiliary unit for the painting contractor. It weighs but 32 pounds and can be operated from a light socket or wall plug.

Designated as the NCD compressor, the unit is designed to deliver 2½ cubic feet of air per minute to a spray gun operating at 35 pounds pressure. The NCD furnishes a smooth, continuous flow of air with power and volume ample to apply spray materials without excessive thinning, it is claimed.

In addition to furnishing ample power to do high quality painting, the NCD can be used to deliver air to do countless other shop or household jobs.

The NCD is available either as a separate air compressing unit or combined with several different complete spray painting outfits.

DeVilbiss NCD Compressor



Behrlon®-*ize for Beauty*

The rich, velvety softness and warmth of BEHRLON rayon flock finish gives this plastic radio cabinet screen something extra, makes it more desirable, more salable. You can apply BEHRLON to plastic, wood or metal products, and do it quickly and at low cost. You simply spray on the BEHRLON fibers like lacquer. BEHRLON adds color, too. More than 34 colors to choose from — and all are the result of careful laboratory control for richness and fidelity.

See what BEHRLON can do for your product. Simply send us samples for a free BEHRLON demonstration. Our skilled product engineers will apply the proper BEHRLON finish in the colors you choose, and return the samples promptly for your examination. Send for the new BEHRLON color swatch card. Write us today.

BEHR-MANNING

BEHR-MANNING · TROY, N.Y.

(DIVISION OF NORTON COMPANY)

76 YEARS OF QUALITY SERVICE

Mystic "Self-Stik" Labels

A new type of label is being offered under the trade name of Mystik "Self-Stik" Labels by Mystik Adhesive Products, 2635 N. Kildare Ave., Chicago 39, Ill. These labels may be applied to practically any surface by means of a pressure-sensitive adhesive—without moistening. This feature is said to speed application in production and simplify many labeling problems.

Mystik Labels are applicable for product identification or they may be used to attach instructions, such as wiring diagrams, directions for operating, or information for servicing, directly to the product. This method also may be used to attach instructions to sub-assemblies and parts during production.

Mystik Labels are said to be durable and long lived, yet may be easily and instantly removed.

Binks No. FG 12 Production Flocking Unit

An electrically driven flock agitator designed to solve the problem of handling the fine fibrous material, keeping it dry and in suspension for delivery in an even flow to the nozzle of the spray gun has been developed by Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Ill. Designated as the No. FG 12, the unit is said to be easy to fill while in operation without interference with production.

Binks No. FG 12 Production Flocking Unit

The lightweight Binks Model 172 flock gun, designed to be used with the new flocking unit, is said to require minimum air pressure and air volume. One suggested combination requires 4.5 cubic feet of air per minute at 30 lb. pressure.

The Binks No. FG 12 Production Flocking Unit is available separately or as a part of a complete flocking outfit.

Cellulo Stainless Steel Filter Press

Cellulo Stainless Steel Filter Press

Designed for use in the clarifying of liquids, such as industrial chemicals, paints, varnishes, wax, oils, and pharmaceuticals, a new model filter press has been developed by The Cellulo Co., Sandusky, Ohio, manufacturer of filters, filtermass, and filter papers.

It is a stainless steel filter of the plate and frame type, using filter paper sheets 13¾ inches square, with internal, leakproof ports, requiring no rubber gaskets. Each filter sheet has 164 square inches of active filtering surface. The plates are fitted with permanent stainless steel backing screens so that any kind or weight of filter papers or asbestos pads may be used as the filtering medium, it is claimed. Greater effective filtering area is thereby obtained, free of corrosive action, along with simplification of operation, the manufacturer states.

The filter press is available in several

YOU don't have to take chances!

You don't have to take chances with the black finishing of your steel parts when you use Du-Lite. If you have hesitated to specify or experiment with black chemical finishes, you need have no doubts about Du-Lite and its uniform, easy workability.

You're right with DU-LITE

Du-Lite processing acts chemically on the surface of the metal producing a beautiful, intense black finish with penetration—not a coating. It will not chip, peel, crack, or blister, nor cause dimensional changes. This tough, black oxide is highly rust-resistant, friction-reducing and long wearing.

While Du-Lite is not the answer to *all* your finishing problems, in many, many cases involving production black finishing of steel and steel alloy parts (not stainless) it has proved to be the best and least expensive to operate.

DO IT RIGHT WITH DU-LITE

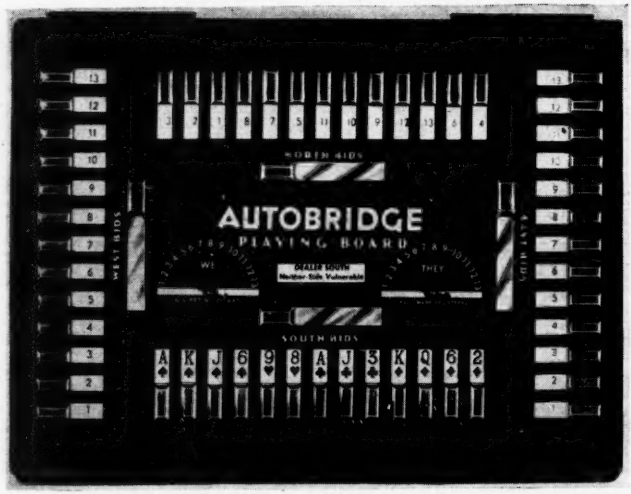
Write or Phone Today

A consultation with the Du-Lite Field Engineer in your territory will quickly establish the advisability of your using Du-Lite. He is familiar with diverse problems similar to yours, and will be frank in his advice to you.

You may be sure that you can . . . Do It Right With Du-Lite. Write or phone the main office at Middletown.

THE DU-LITE CHEMICAL CORPORATION

100 RIVER ROAD • **MIDDLETOWN, CONN.**



Adheron Satin Blac
Finish applied to
aluminum product

types to accommodate filtering with or without filter aids or for cake building space, and is also available in other metals, such as cast iron, aluminum, and bronze.

Adheron Satin Black Finish for Aluminum

The Duralac Chemical Corp., 84 Lister Ave., Newark, N. J., has announced the development of a new finish, Adheron Satin Black.

Adheron can be used as a primer under nitrocellulose lacquer or under synthetic baked finishes, or it can be used as a satin or semi-gloss finish for aluminum and other non-ferrous metals, the company states.

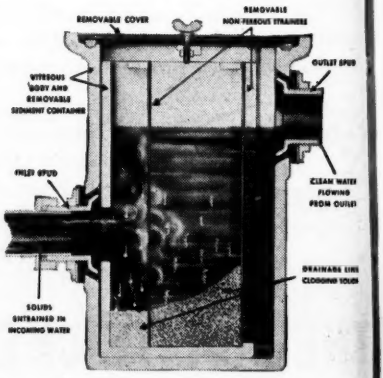
One application of Adheron Satin Black on aluminum is being made by the Autobridge Company, manufacturer of the solitaire bridge game. The accompanying illustration is a view of the Autobridge playing board.

Zurn Solids Interceptor

The J. A. Zurn Mfg. Co., Erie, Pa., announces the development of a solids interceptor designed to prevent fragments of solids present in waste water from flowing into building drainage lines and causing costl trouble and inco venience.

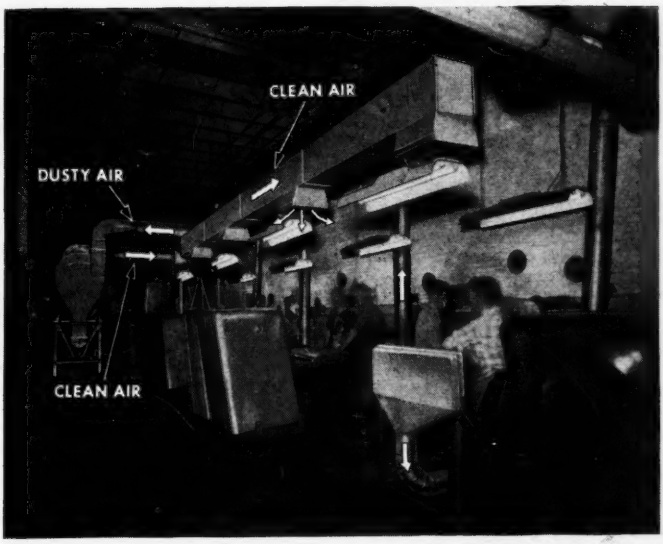
Engineered t perform the spe cific protectiv function of inte cepting and col lect bits of plaste metal, glass, an other solids tha would enter an clog drainage lines the interceptor i said to permi quick and eas cleaning. The im pervious non-met allic cover is easily removed by un locking a cover clamp. With a sin gle motion, the sediment container can be readily lifte out for cleaning.

The intercepting function of the uni is accomplished by two perforated meta strainers which intercept the solids in th waste water as it passes through the in terceptor body. The perforated meta strainer nearest the inlet intercepts th larger fragments; the second meta strainer completes the interception of a solids passing through the interceptor. I addition, they serve as baffles to quie the turbulence of the water, permittin



Zurn Solids Interceptor

Air Tumbler



THE MASTER OF DUST IN INDUSTRY

This picture shows what can be and is being done with the AIR-TUMBLER, a Wet Dust Collector which wets the dust but not the air. This ventilating system could be so designed because of the AIR-TUMBLER'S

MAXIMUM EFFICIENCY, (The dust-free air is fully recirculated and discharged directly above the heads of the men working on the four grinding benches served by the AIR-TUMBLER.)

AND MINIMUM HUMIDIFYING ACTION. (The returned air is so slightly humidified that the men can work in its direct path without being chilled.)

In addition, the AIR-TUMBLER is serving management by economy in power consumption and by savings in heating and maintenance costs.

Write for explanatory booklet.

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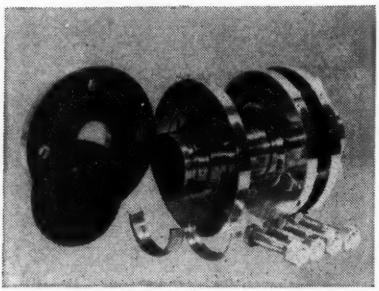
DUST SUPPRESSION & ENGINEERING CO.
LAKE ORION • MICHIGAN

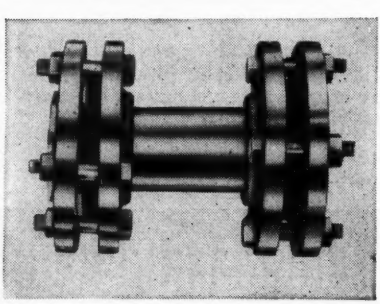
the solids to more readily drop to the bottom of the sediment container where they are collected for removal. The inlet, located approximately 4 inches from the bottom of the interceptor, directs the water upwards to the outlet near the top of the opposite side, leaving the collected solids undisturbed. Water seal makes the interceptor a trap.

Gaco Pipe Joint

A new pipe joint designed to simplify the process of installing and repairing rubberlined pipe has been announced by the Gates Engineering Co., New Castle Ave., New Castle, Del. Designated as the Gaco Joint, it is said to possess the following advantages: (1) lined pipe may be bought in sections, cut and installed on the job; (2) pipe may be cut, grooved, bored, and counterbored with a special machine or with a regular pipe machine equipped with an adapter; (3) rubber inserts may be slipped into place and flanges bolted together to complete the assembly in a minimum amount of time; and (4) repairs to process lines may be made by plant maintenance crews using standard Gaco pipe joints from stock—minimizing process shutdown.

Gaco Pipe Joints are available in 1½ to 4-inch pipe sizes as 45-degree ells, 90-degree ells, Y's, tees, and separate flange kits for connecting straight lengths.





Gaco Pipe Joints before and after a typical installation

No. 30 Alfco Dry Chemical Fire Extinguisher

No. 30 Alfco Dry Chemical Fire Extinguisher

A new dry chemical type fire extinguisher has been announced by the American - LaFrance - Foamite Corporation, Elmira, New York.

According to claims of the manufacturer, it has many advantages such as longer range, longer duration of discharge, more complete discharge of the dry chemical contents, gas-tight, all-internal expelling gas connections, built-in safety disc, and lighter weight.

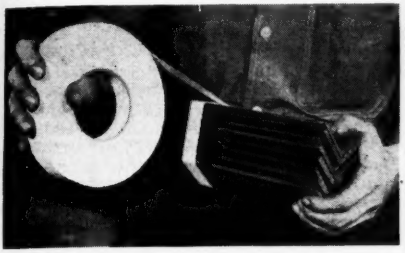
The dry chemical is non-toxic, non-corrosive, a non-conductor of electricity, and will not freeze, it is claimed.

The new unit has the Underwriters' Laboratories label and is rated B-1 and C-1. It is a hand portable unit identified as No. 30 Alfco Dry Chemical, and is recommended for liquid and electrical fires.

Scotch Tape No. 320

Product of the Minnesota Mining and Manufacturing Co., St. Paul 6, Minn., a paper tape strong enough to be used for heavy duty packaging has been announced. Designated as No. 320 in the Scotch brand industrial tape line, it is said to have a tensile strength of 180 pounds per inch of width.

According to the manufacturer, the tape is thin (13-15 mils) and flexible and



Scotch Tape No. 320 used for packaging angle iron

it has a pressure-sensitive adhesive which grips immediately upon contact. The strength of the tape is attributed in part to reinforced thread-like fibers which, permanently imbedded in the adhesive, are said to afford a tear resistance of over 1600 gram-centimeters.

The tape is designed to be used for packaging metal pipes, conduits, rods. rolls, sheets, coils, fittings, and tubing. as well as in the shipping of stoves. metal cabinets, and other household equipment. Advantages cited include speed in wrapping and elimination of damage to the material being packaged.

Hard Chromium Plating Process

The Chrome Electro-Forming Co., 7515 Lyndon Ave., Detroit 21, Mich., announces that it has been licensed exclusively to perform precision hard chromium plating by the Morey Process.

The licensee lists advantages of the process as: close control of plate thickness; excellent throwing power; maximum adherence and ductility with minimum porosity; smooth, bright finish. Gages, taps, reamers, dies, molds, and other tools may be plated for additional wear life, it is claimed.

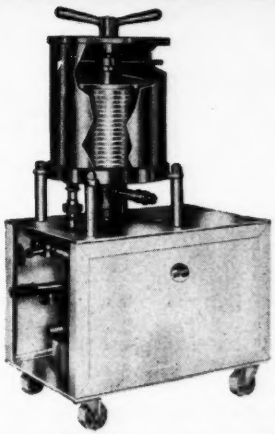
ERTEL CYLINDER TYPE

Positive Seal

DISK FILTER

1. FILTERING ELEMENTS are independently tightened to provide positive seal.

2. OUTER CYLINDER is closed by separate handwheel to prevent drippage or evaporation.



★ The Ertel Disk Filter will accomodate any number of filter sheets up to its rated capacity without danger of bypassing unfiltered liquid. Designed for plating solutions such as copper, chrome, nickel, tin, etc. Filter rings, as well as entire filter, are rigidly constructed for long life. Reloading or cleaning consumes but a few minutes time. Standard portable unit is furnished in stainless steel unless otherwise specified.

WRITE FOR BULLETIN ECD-1

ERTEL ENGINEERING

CORPORATION

KINGSTON 3, NEW YORK

ASBESTOS FILTER SHEETS • ASBESTOS SHEET FILTERS • PUMPS • MIXERS
CYLINDER TYPE DISK FILTERS

AO Panoram Goggle

The American Optical Co., Southbridge, Mass., announces that the Panoram Goggle is now available with rubber

AO Panoram Goggle

cushions to provide extra comfort.

According to the manufacturer, the cushions are molded to the exact shape of the Panoram eyecup and can be slipped into place very easily—with no need for stapling, sewing, or cementing. Once in place, they stay, but can be replaced in a few seconds. Made of soft, pliable, non-toxic, Neoprene sponge rubber, the cushions assure extra protection against dust and flying particles.

Pocket-Size Engineering Slide Rule

The DuBois Co., Industrial Division, Cincinnati 3, Ohio, manufacturer of Klarifiant, Filmite, and Strypp spray booth maintenance products, is offering a pocket-size plastic slide rule free to readers of PRODUCTS FINISHING.

Engineers, foremen, and superintendents find this smooth-working rule handy, convenient, accurate, and easy to read. It is especially useful for calculating tank capacities, figuring compound charges, converting ounces to pounds, ounces to percentages, and vice-versa, and for multiplication and division problems. It is 1¼ inches wide and slightly more than 6¼ inches long.

Vitreous Enamels for Aluminum

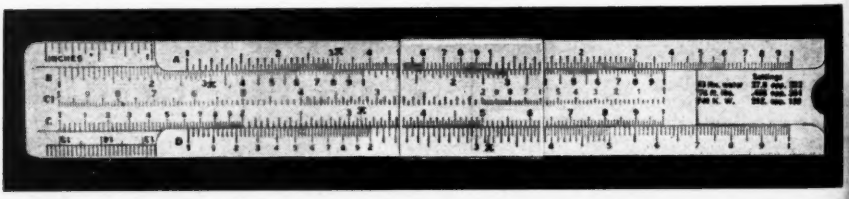
Vitreous enamels which can be applied to certain alloys of aluminum to enhance the metal's durability, utility, and beauty have been developed after six years of research in the laboratories of the Electrochemicals Department, E. I. du Pont de Nemours & Co., Wilmington 98, Delaware.

The new enamel for aluminum may be fired on aluminum strips, sheets, and castings in furnaces similar to those used for the application of porcelain enamel to steel products. However, the aluminum enamels are fired at a temperature several hundred degrees lower than the temperature employed in enameling steel.

Enameling of aluminum to increase its resistance to corrosion and widen its decorative uses makes possible its increased usefulness, particularly outdoors where it is subject to weather and the corrosive effects of the atmosphere. Enameled aluminum is now being used for colorful, mar-resistant store-front panels and for light, strong, weather-resistant advertising display letters. Vitreous enameled aluminum sanitary ware and accessories, washing machine tubs and agitators, architectural tile, and outdoor furniture represent some prospective uses for the new enamel.

Enameled aluminum is unusually mar-resistant, but if it is accidentally chipped or cracked, the aluminum will not develop rust. Enameled aluminum sheets for architectural purposes can be made in any convenient standard length, shipped to the job, sawed and fit.

The new enamels for aluminum contain a high percentage of lead, making them unsatisfactory for coating articles that are likely to come into contact with food. Tests have shown that the resistance



Pocket-Size Engineering Slide Rule Offered by The DuBois Company

of the enamels to acids and alkalies is comparable to that of enamel on steel. Research at the present time has developed satisfactory enamels for two alloys of aluminum, 61-S wrought alloy and 43 casting alloy. Test panels exposed for two to three years on the roof of a large city building indicate the probability that the enamels may be satisfactory on certain other alloys.

Black Arrow Model N9600 Air Conditioner

The Black Mfg. Co., 1433 W. Baltimore St., Baltimore 23, Md., has announced the development of a new utility air conditioner that is said to be ideal for use with medium production spray guns. Known as the Black Arrow Model N9600, the unit handles 35 cubic feet per minute at 80 pounds pressure. According to the manufacturer, it is made of 100 per cent rustless materials with no die cast parts or through bolts used in its construction; contains no moving parts or parts that require replacing; and the cylinder tube is cold impact extruded aluminum capable of withstanding a pressure of 1,000 pounds per square inch.

The filtering element of the Model N9600 is constructed entirely of brass and the regulator body is forged brass with a stainless steel air valve assembly. The regulator cap is equipped with a stainless insert to eliminate freezing of the pressure regulating key. The unit is equipped with an oxygen type regulator and gage showing regulated air pressure, an outlet for regulated air, an outlet for main line pressure, and a draincock at the bottom for daily draining of moisture and oil.

Black Arrow Model N9600 Air Conditioner

INDUSTRIAL Phibro CHEMICALS

Nickel Salts
Cyanides
Cleaners
Degreasing Compounds
and other Industrial Chemicals

Philipp Brothers Chemicals, Inc.
37 WALL STREET, NEW YORK 5, N. Y.
PHILADELPHIA HARTFORD BOSTON PROVIDENCE BALTIMORE
Cable Address: PHIBROCHEM NEW YORK

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

Thermocouple and Pyrometer Accessories Bulletin. A new bulletin (No. P1238), published by The Bristol Co., Waterbury 91, Conn., contains 56 pages of detailed information on thermocouples, protection tubes, and other pyrometer accessories. A techical section, described as the "Users' Manual," contains engineering handbook data on such subjects as factors affecting thermocouple life, corrosion and poisoning, thermocouple reproductibility, thermocouple insulation, and the things every user of pyrometers should know about selecting the right thermocouple and protection tube for every application. A number of typical applications are illustrated.

Users report 50% to 90% more production in *polishing, lapping, or burring* by use of Schauer Speed Lathes. Find out how you can use these low-cost, high-production machines for your secondary finishing operations. "Save with Schauer." Write for Catalog 480.

THE SCHAUER MACHINE CO.

• ORIGINATORS OF TODAY'S SPEED LATHES

2065 Reading Rd., Cincinnati 2, Ohio, U.S.A.

DeVilbiss NCD Air Compressor. The DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio, has issued a four-page folder describing and illustrating its NCD Air Compressor for the home workman, small service shop, or as an auxiliary unit for the painting contractor. Complete specifications are included.

Dillon Industrial Thermometer Bulletin T. An interesting and informative bulletin has been issued by W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill., describing the Dillon stainless steel thermometer. Features, sizes, and advantages of the instrument are detailed in the bulletin, together with operating characteristics and suggested uses.

Miskella Porta-Flexer portable and flexible infra-red lamp heating section is illustrated and described in a bulletin issued by The Miskella Infra-Red Co., E. 73rd and Grand Ave., Cleveland 4, Ohio. Several of the many possible position settings to which the portable and flexible infra-red unit may be adapted are illustrated and described in the bulletin.

Houghto-Black for blackening steel parts is described in a four-page three-color folder available from E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. The process involving the use of Houghto-Black is described in detail and illustrated by means of a typical flow chart. Advantages obtainable through the use of the process are listed together with examples of steel parts on which Houghto-Black is being applied.

New Holland Kreider Centrifugal Dryer. A new catalog on the New Holland Kreider Centrifugal Dryer has been released by the New Holland Machine Co., Dept. PF29, New Holland, Pa. The front cover shows one of the two 10-year-old Kreider Dryers still in use at Mechanical Plating Works, Detroit, Mich. Other pictures show cutaway views of the latest unit with steel woven mesh basket, the auxiliary steam heating unit, and the auxiliary natural gas heating unit. Specifications and other useful data are included.

Five types of photoelectric instruments to measure appearance and other optical properties of materials are dicussed in an eight-page bulletin published by Henry A. Gardner Laboratory, Inc., Bethesda 14, Maryland.

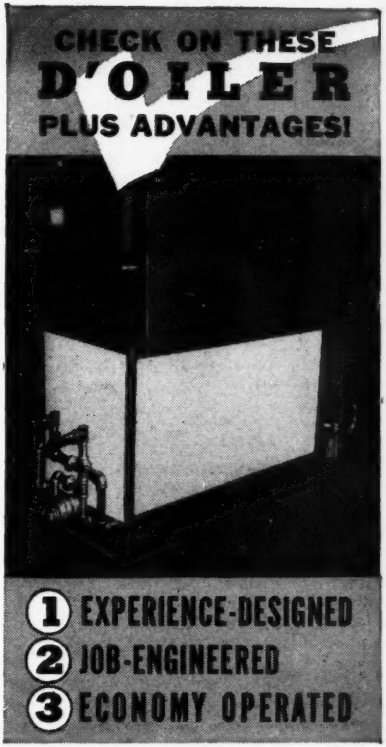
Bullard-Dunn Automatic Station Type Conveyor is the subject of a four-page bulletin issued by the Bullard-Dunn Process Division, The Bullard Co., Bridgeport 2, Conn. A full description and specifications are given.

Bulletin BB-103 entitled "Burnishing Barrels" is being distributed by the Hanson-Van Winkle-Munning Co., Matawan, N. J. The bulletin describes the new Merril-type burnishing barrel, listing specifications and detailing features of the barrel by means of illustrations.

Unichrome Tape 705, designed to be used for complete coating of plating racks, patching of damaged coatings, and "stop-off" plating applications, is described in a bulletin issued by United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y. Instructions for applying the tape are included in the bulletin.

Red-Skin, a strippable plastic coating composition for the protection of polished surfaces of all kinds during manufacturing, handling, storage, and shipment, is described in detail in a six-page folder available foom the Dennis Chemical Co., 2701 Papin St., St. Louis 3, Mo. Application instructions are included.

Chromalox Application Reports. The Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pa., is currently offering data sheets covering Chromalox RAD Heaters used for the following functions: heating metal molds (Application Report No. 101); drying plastic powders (No. 102); static removal from paper on printing press (No. 103); maintaining processing temperature in Micarta Strips until reaching the punch press (No. 104); and flowing of sealing material in battery case (No. 105).



FOR THOROUGH METAL CLEANING

The D'OILER Vapor Spray machine, illustrated above, can be used as a vapor-spray, or a straight vapor degreasing unit. Drain table recaptures dragout from basketed parts . . . all-around insulation reduces heat losses . . . exhaust duct on two sides safeguards operator . . . pump drive for standby solvent eliminates hand pouring.

Every D'OILER type is built to do a specific job . . . is designed with the "on-the-job experience" necessary to provide a degreaser that does the work, in the required volume, economically.

Our engineers will gladly advise on degreasing problems; your inquiries will receive prompt attention. Write today.

Mechanical
PROCESS COMPANY
P. O. BOX 88, SOUTH ORANGE, N. J.

Zin-O-Lyte Zinc Plating Salts. An eight-page manual has been prepared by E. I. du Pont de Nemours & Co., Electrochemicals Dept., Wilmington 98, Del., presenting complete information on the use of "Zin-O-Lyte" zinc plating salts for bright zinc plating.

Eclipse Drum Finishing Equipment. The Eclipse Air Brush Co., Park Ave. and 13th St., Newark 7, N. J., is now distributing a four-page folder featuring its line of manual and automatic drum finishing units. Illustrated and described are the Eclipse drum rotating unit, semi-automatic drum painter, and automatic chime painter.

Belke Finishing Barrels. The Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill., has available a 12-page bulletin which presents complete information on Belke Barrels for deburring, burnishing, cutting down, drying, and tumbling. Bulletin 590 tells how the barrels reduce finishing time, produce more uniform finishes with fewer rejects, and effect substantial savings in labor.

Dualheet Paint and Air Heater is described in a four-page two-color bulletin being distributed by The Beck Equipment Co., 10118 Detroit Ave., Cleveland 2, Ohio. The bulletin describes by means of illustrations and accompanying explanations the operation of the Dualheet Paint and Air Heater and lists the advantages which may be obtained through the use of this product.

K-P Catalog No. 36. A catalog describing in detail the industrial wire cloth and woven wire screens manufactured by the company is being offered by Korb-Pettit Wire Fabrics and Iron Works, Inc., 1509 N. Mascher St., Philadelphia 22, Pa. The 48-page illustrated catalog contains information on how to specify and order screens and wire cloth, data on square opening space screens, types of weaves and crimps, double crimp wire cloth, square mesh market grade wire cloth, and several useful conversion and data tables.

Cut-Off, Polishing, and Grinding Wheel Data. The Allison Co., Bridgeport 1, Conn., manufacturer of abrasive products, has announced the publication of new bulletins on Rubber Bonded Abrasive Cut-Off Wheels (Bulletin 4948R), Resinoid Bonded Cut-Off Wheels (Bulletin 4948B), Rubber Bonded Polishing Wheels (Bulletin 2948P), and Ball Race Grinding Wheels (Bulletin 1948BR). Data include specifications and information on each type of wheel, including material and operations for which recommended, and general recommendations.

"Zinc Die Castings in Ever Widening Fields" is the title of a 68-page booklet just published by The New Jersey Zinc Co., 160 Front St., New York 7, N. Y. Included are photgraphs depicting the use of zinc die castings in the assembly of 167 different products in ten major consuming fields.

"Stop Dust with Dustkop" is the title of Bulletin A-555 issued by the Aget-Detroit Co., 340 Main at Washington, Ann Arbor, Mich., which completely describes "Midget" Model 335 Dustkop Dust Collector. Included are recommendations for its installation and use on small surface grinders, bench, tool grinders, disc and belt sanders, and so on.

NEW BOOKS

The Lea Method of Finishing. Published by the Lea Manufacturing Co., Waterbury, Conn. 160 pages. Illustrated. Price $5.00.

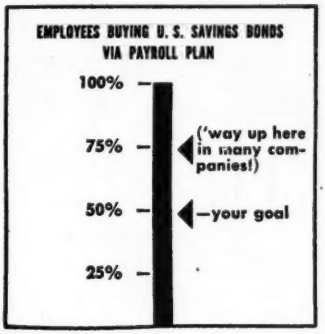
This comprehensive book on the finishing of metals, plastics, and wood is divided into three sections as follows:

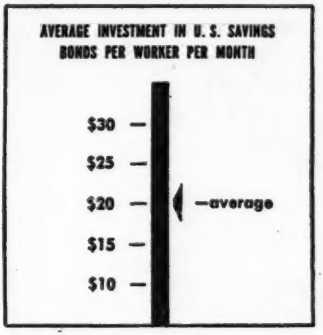
Section 1—general discussion of finishing, the Lea Method, terminology, and the finishing characteristics of metals, plastics, and wood. A section on the finishing of "electrodeposited metals" is included.

Section 2 includes case studies showing how some 125 companies either improved finishes, reduced finishing costs, or both.

Section 3 presents a detailed discussion of finishing and plating materials and how they should be used, including many items now manufactured by the Lea Manufacturing Company.

How is YOUR company doing in this "EVERYBODY-BENEFITS" plan?





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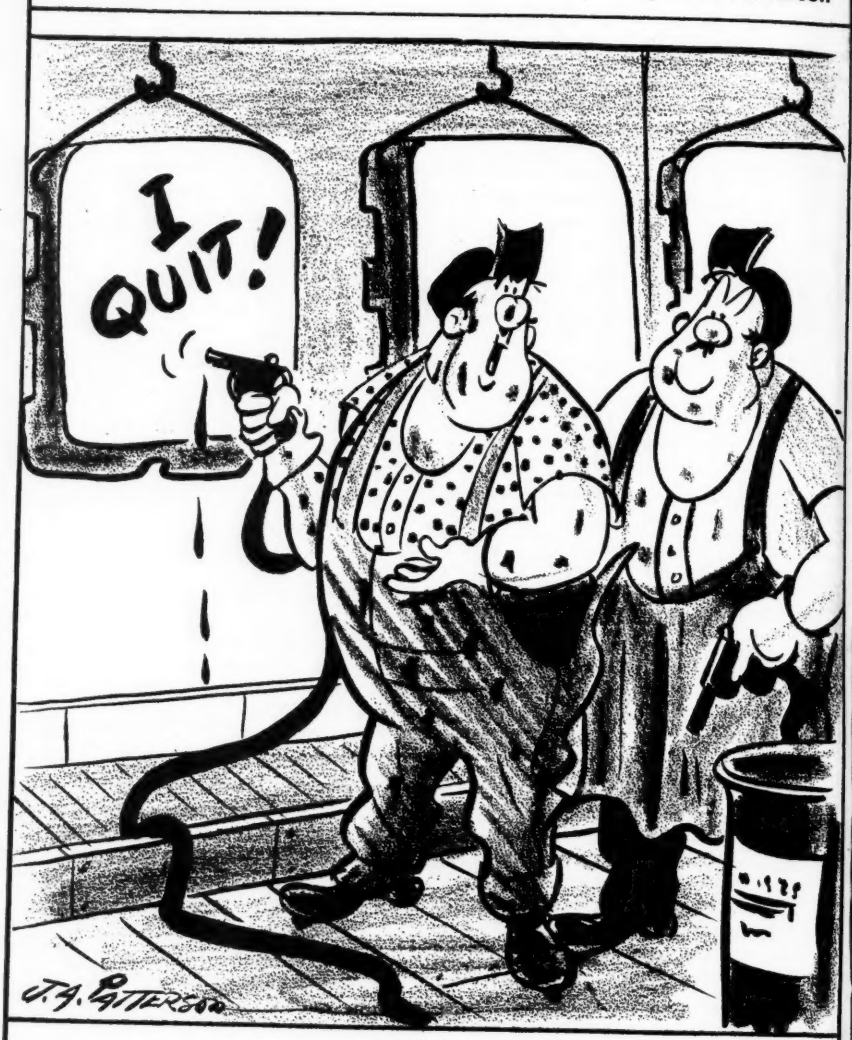
The Finishing Touch — **By J. A. Patterson**



"Do you think that's a little too informal — or should I put 'I hereby resign'?"

Opportunity Section

HELP WANTED SALESMAN INDUSTRIAL SALESMAN

National organization, selling quality products for 25th year, offers permanent sales positions with salary, commission, expenses. Industrial selling experience required. Knowledge of metal finishing processes such as electroplating, painting, metal cleaning, etc. desirable. Need men now living in Detroit, Cleveland, Chicago, Indianapolis, and area of Rockford, Illinois. Thorough training given. Our men know of this advertisement. Write fully giving all educational and business details. Write Box 22, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

WANTED

Experienced Industrial Finishes Sales Manager and Salesmen

for the Middlewest States in connection with our new plant located at Lafayette, Indiana. Address applications with full particulars as to age, education, experience, etc., in confidence to personal attention of Mr. O. J. S. deBrun, President, The Egyptian Lacquer Manufacturing Company, R. K. O. Building, Rockefeller Center, New York 20, N. Y.

MOTOR GENERATOR SET

FOR SALE — New Electric Products Motor Generator Set, rated 5000/2500 amperes, 12/24 volt, 360 RPM 220 volt, 60 cycle, 3 phase synchronous motor, Unity Power faction 25° C Set.

Daniels Plating Barrel & Supply Co.
129 Oliver Street Newark 5, N. J.

INDUSTRIAL FINISHES FORMULATOR — This is *really* an opportunity for the man who has had about ten years experience formulating production line finishes and who is now seeking elsewhere the recognition—both financially and responsible-wise — he deserves. This opportunity is afforded by a well-established and recognized paint manufacturer located in the East. Your reply will be treated in strictest confidence. Our employees know of this ad. Write Box No. 25, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio.

FOR SALE: 2 Hammond 10 HP buffing lathes, brand new, never used, double spindle, heavy duty, 220V, 3 phase, push button, complete with controls. ALSO: 1 Divine 6 unit type, straight line automatic polishing and buffing machine, including 6-7½ HP units, with conveyor, drive, belt, and all motors, starters and applicators, 220V, 3 phase, 60 cycle, USED. Write Box No. 24, c/o PRODUCTS FINISHING. 431 Main Street, Cincinnati 2, Ohio.

Experiments recently made in the testing bakery of The Nulomoline Company in New York City reveal that fruit cakes may be successfully baked in the same lithographed metal gift boxes in which the cake is sold without marring the lithography on the tins, reports the Can Manufacturers Institute. The can enamels used thus far in tests have proven their durability and resistance to baking heat. These enamels have been composed of true or primary colors or combinations of these colors. No discoloration has been noticed to date.

Iridium continues to be used in alloy form where a 10 per cent iridium and 90 per cent platinum mixture is the most popular. Alloys of higher iridium content are employed in ignition systems, especally for airplanes.

CATALOGS

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Drying Systems
Burdett "infra-red" gas systems are described in a 12-page circular available from the Burdett Manufacturing Co., Chicago 24, Ill. Typical installations for paint and varnish drying, degreasing, baking, evaporating. and other operations are described.

2. Non-Ferrous Alloys
The Seymour Manufacturing Co., Seymour, Conn., has issued catalogs describing specifications, properties, and characteristics of Seymour Nickel Silver Alloys and Phosphor Bronze Alloys.

3. Black Finishes
A "black book" describing details of Zinc Black and other Black-Magic metal finishes has been published by the Mitchell-Bradford Chemical Co., Stratford, Bridgeport, Connecticut.

4. Electrostatic Spray Painting
A booklet entitled "Ransburg Coating Processes" describing electrostatic spray painting has been issued by Harper J. Ransburg Co., Indianapolis 7, Indiana.

5. Lead Anodes
A four-page technical bulletin now being distributed by the Division Lead Co., Chicago 22, Ill., presents illustrated and descriptive data on Divco 71-Point Lead Anodes for chrome plating .

6. Backstand Belts
"Facts About Backstand-Belt Grinding and Polishing" are enumerated in a booklet being distributed by Armour & Co., Chicago 9, Illinois.

7. Aluminum Finishes
A 64-page manual entitled "Finishes for Alcoa Aluminum" is available from the Aluminum Company of America, Pittsburgh 19, Pennsylvania.

8. Centrifugal Dryer
The New Holland Machine Co., New Holland, Pa., has published a bulletin providing complete specifications of the New Holland Kreider Centrifugal Dryer and describing typical installations.

9. Infra-Red Brochure
The Fostoria Pressed Steel Corp., Fostoria, Ohio, has published Brochure EV-1146 which illustrates and describes the use of the Fostoria Evenray System in industrial heating applications.

10. Industrial Wire Cloth and Screens
K-P Catalog No. 36, issued by Korb-Pettit Wire Fabrics and Iron Works, Inc., Philadelphia 22, Pa., describes by means of illustrations and data tables the many types of industrial wire cloth and woven wire screens manufactured by the company.

11. Gold Plating
An instruction booklet describing gold coloring solutions for various shades of gold is now being issued by Baker & Co., Inc., Newark, New Jersey.

12. Motor Generators
Bulletin 202 published by the Electric Products Co., Cleveland 12, Ohio, describes the entire line of EP motor generators for electrolytic processes.

13. General Purpose Fans
"General Purpose Fans" is the title of an eight-page bulletin designated as Bulletin 481 distributed by the New York Blower Co., Chicago 16, Illinois.

14. Flock Color Card
A color card containing samples of flock finishes has been issued by the Rayon Processing Company of Rhode Island, Inc., Central Falls, Rhode Island.

15. Plating Equipment
Bulletins describing equipment for various plating, polishing, anodizing, descaling, oxidizing, and deburring operations are available from Munning & Munning, Inc., Newark, New Jersey.

16. Chemifinishes
General information concerning the finishing of metals with Du-Lite materials is contained in literature prepared by The Du-Lite Chemical Corp., Middletown, Connecticut.

17. Electric Heaters
An illustrated booklet "100 Ways to Apply Electric Heat" is available from Edwin L. Weigand Co., Pittsburgh 8, Pa. It contains photographs and drawings showing Chromalox Electric Heaters at work in manufacturing plants.

18. Temperature Controls
Self-operated temperature controls for plating and finishing applications are described in Catalog No. 650 available from the Sarco Co., Inc., New York 1, New York.

19. Wetordry Finishing
"A Faster, Better Finishing Method for Metal, Plastic or Glass" is the title of a folder available from the Minnesota Mining & Manufacturing Co., St. Paul 6, Minn., which describes the 3-M Wetordry Method—a high speed means of precision grinding and finishing.

20. Striplastic No. 320
A bulletin describing the properties and applications of Striplastic No. 320 is available from The Striplastic Co,. Cleveland 6, Ohio.

21. Cleaning Emulsion
"Minit-Kote," a cleaning emulsion for preparing metal surfaces for painting, is fully described in a four-page two-color illustrated folder prepared by Klem Chemicals, Inc., Dearborn, Michigan.

22. Descaling Process
The Bullard-Dunn Process of electrochemical descaling of ferrous metals is described in detail in a bulletin available from the Bullard-Dunn Process Division, The Bullard Co., Bridgeport 2. Connecticut.

23. Finishing Equipment
The Despatch Oven Co., Minneapolis 14, Minn., has prepared a 16-page Bulletin C-51 which illustrates and describes its complete line of gas-oil, electric, and steam finishing equipment.

24. Zinc and Cadmium Dip
"Iridite," a quick dip process for corrosion resistance or as a paint base or final finish on all zinc or cadmium surfaces, is described in a four-page folder published by Allied Research Products, Inc., Baltimore 5, Maryland.

25. Precious Metal Plating
A 16-page booklet issued by A. Robinson & Son, New York 2, N. Y., presents in usable form accepted methods applied in electroplating such articles as watch cases, insignia, jewelry, novelties, pen and pencil parts with rhodium or gold.

26. Plating Barrel
Facts concerning the construction and operation of the new King Hardwood Plating Barrel are presented in a folder available from King's Hardwood Plating Barrels, Dayton 3, Ohio.

PRODUCTS FINISHING
431 Main St., Cincinnati 2, Ohio

I am interested in receiving the following literature reviewed in your February issue.

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